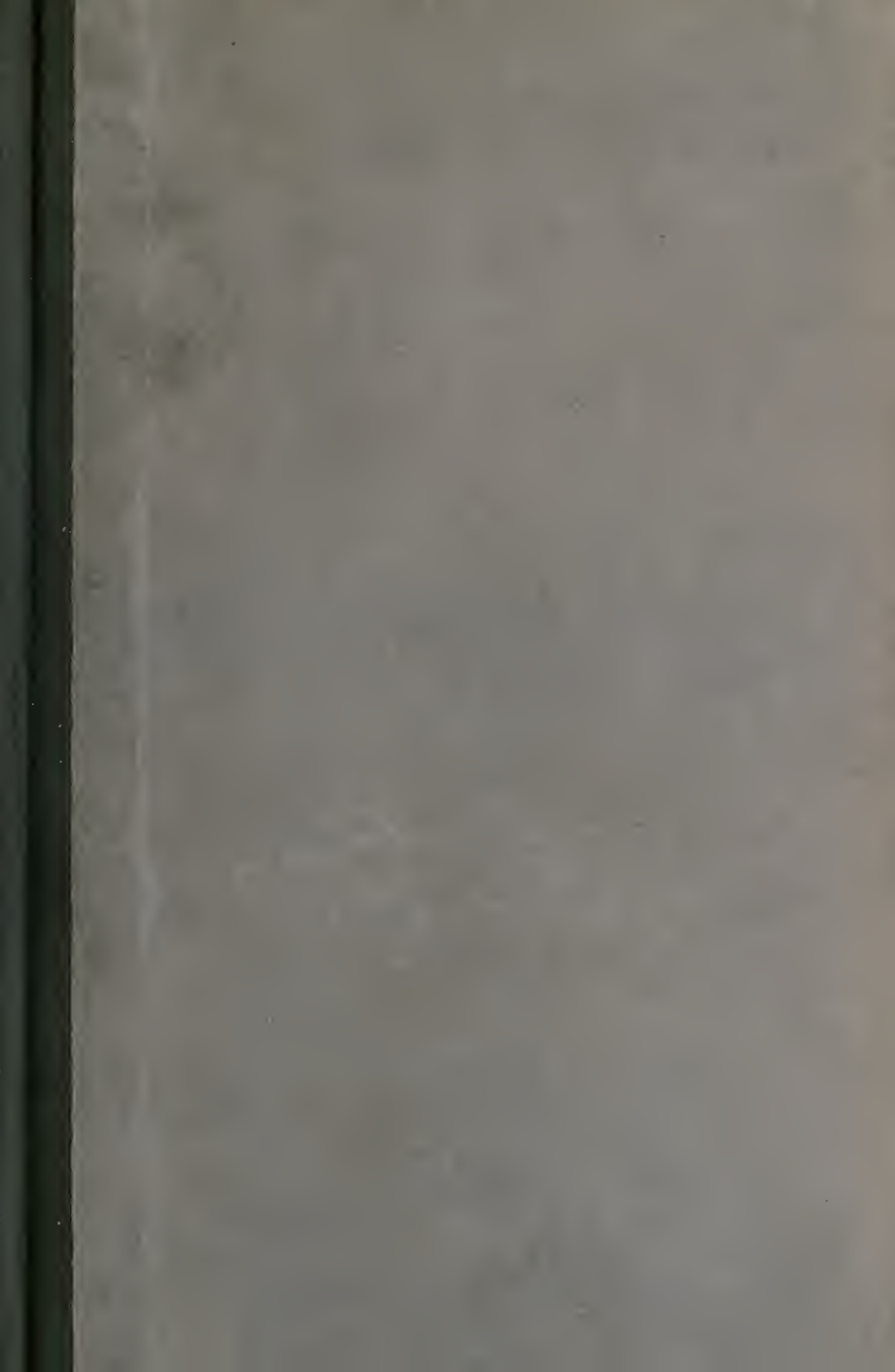






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THE NEW PHILOSOPHY.

Vol. XX

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Nos. 1-2

Editorial Notes

We call the attention of our readers to the last page of this issue, containing the announcement of the Annual meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION in Philadelphia on May 23. The papers to be read offer an unusual variety of interesting subjects, and should call forth instructive discussions.

In our present issue we print an abridgment of Swedenborg's chapter on The means which conduce to True Philosophy. This is the opening chapter of the PRINCIPIA, and in its unabridged form the portion printed herein occupies thirty-two pages. We hope in a future issue to print an abridgment of the latter part of the chapter, which treats of the True Philosopher.

The translation is that by Mr. Clissold, as printed in the first English edition of the work. We have made no systematic attempt to revise this translation, which, while on the whole, correct, is frequently unnecessarily verbose; but in about half a dozen cases where our attention was arrested by apparent obscurity, we have made some considerable alteration.

This opening chapter of the PRINCIPIA, might well be considered as a separate treatise. Written at the time of Swedenborg's first entrance into the literary world of Europe, it lays down the essential qualifications that must be possessed by him who would succeed in penetrating into the arcana of Nature,—EXPERIENCE, GEOMETRY, REASON.

EXPERIENCE must be gathered from many men; it must be extensive; and yet not so extensive as to bury the searching mind under a mass of minute and unessential details, which, while absorbing the attention, add nothing to the enlightening of the subject in hand.

GEOMETRY is requisite, but it is not the mere geometry of solid bodies. By geometry here, Swedenborg means the knowledge of the laws of mechanism that are impressed on the universe by the Creator. The true philosopher must know that universal creation proceeds from first to last only according to stated and definite laws; and it is these laws that he must learn if he would succeed in his search. Swedenborg saw this early in his career, and it is his recognition of the presence of law in the universe that led him to the discovery of the doctrines of degrees, of series, and of modification. These doctrines are all a part of that geometry, which is one of the requisites of true philosophy.

REASON also must be possessed by the philosopher—a reason that can coördinate and intuitively view the collections of experience, in the light of geometry. But it must be a reason that acknowledges God. True philosophy and contempt of the Deity can never be together.

How different are the standards of philosophy in the learned world of to-day,—as likewise they were in the learned world of Swedenborg's day. Learning for the most part takes the place of wisdom; geometry is unknown except on the lower planes of nature; and with the absence of that reason that acknowledges and venerates the Deity the wealth of the world's experience is indeed used for the promotion of material and natural uses, but is wholly devoid of that order which would render it a mirror reflecting the Love and Wisdom of the Creator.

We may indeed trace Swedenborg's success as a philosopher to his preëminence in the three essentials of philosophy. His mind was rich with the experience of an age fruitful in ex-

perimental discovery; and he was remarkably gifted in being able to see the essential facts,—facts which sometimes were accounted as of minor importance. In his search into the meaning of these facts he was guided by his knowledge of that higher geometry which is expounded in the science of Degrees and of Order. And his mind was a rational mind, trained not only by the observations of the moderns, but by the philosophic thought of the ancients, and above all, by that acknowledgment of God and adoration of Him which was inculcated in his mind during his earliest years, and which the learning of riper years served but to make more true and deep. In all his studies and investigations he sought not the fame of learning, but only to penetrate into the arcana of Nature that he might the more closely behold the wisdom of God, and more humbly adore Him. This end he pursued, and it was in this pursuit that he showed himself the true philosopher.

BOOKS RECEIVED.

EARLY HISTORY OF THE NEW CHURCH IN¹ BIRMINGHAM, by the Rev. E. J. E. Schreck. New Church Press, London, 1916. pp. 38. Price, 3/—, and, on handmade paper, bound in art linen, 6/—. This work is a detailed historical account of the planning and dedication of the first building in the world, erected for the worship of the New Church. The story is told in a most interesting way and is illustrated with seven well executed plates.

A SOCIAL SONG BOOK FOR SOCIAL GATHERINGS IN THE GENERAL CHURCH OF THE NEW JERUSALEM. Bryn Athyn, Pa. Academy Book Room, 1916. pp. 130. Price \$1.00. The title sufficiently indicates the purpose of this publication. It comprises 110 songs, all but three of which are set to music. Sixty are composed by members of the Church, and the remaining fifty comprise national and patriotic songs, and miscellaneous selections.

THE MEANS CONDUCTING TO TRUE PHILOSOPHY.

BY EMANUEL SWEDENBORG. (*Abridged.*)

The means which conduce to a knowledge truly philosophical are three in number: EXPERIENCE, GEOMETRY, and the FACULTY OF REASONING.

EXPERIENCE.

1. EXPERIENCE may be defined to be the knowledge of everything in the world of nature which is capable of being received through the medium of the senses. But let it not be imagined that any experience or knowledge derived *a posteriori* and confined only to one man, or even to one age, is sufficient for exploring the hidden paths of nature. To crown an investigation with success, we require the experience of many ages; experience which will go on progressively increasing, till such a store of information is amassed as will supply us with phenomena calculated to elucidate any part or any series of the operations of nature.

It does not appear, indeed, that there is any occasion for that infinite variety of phenomena which some deem necessary, in order to acquire a knowledge of natural things; we have need only of the more important; of such as bear directly and proximately upon the point, and do not diverge too obliquely and remotely from the subject in hand. By too great an accumulation of phenomena, and especially of those which are very remote from their cause, you not only defeat the desires of scrutinizing the occult operations of nature, but you plunge yourself more and more into a maze where you are perpetually drawn aside from the end in view and misled into a distant and contrary region.

In the state of ignorance in which we are at the present day, we can derive knowledge only through experience. It is impossible to receive knowledge immediately from the soul; man attains it only through the medium of organs and senses. Suppose a person destitute of education, left wholly to himself with wild beasts and apes, or advancing to manhood with-

out the society of any animal. What kind of brute would he be? What intelligence would he enjoy from nature? What would be the operation of his higher aura or mind on the organs of his body? or, at a riper age, what would be the operations of the organs of his body on his mind? Man is made and formed, and distinguished from the brutes, by education alone; in the process of which, the organs that mediate between the mind and the body, being brought into exercise, are as it were cultivated and fashioned; and exercise so disposes the elements enclosed in the small membranes and organs, as to enable the most subtile tremors and motions to pass and repass over them; and opens, as it were, those secret and intricate avenues which lead to the most subtile and active substances of our nature. It is by means of this that the oracles of our rational mind are issued and disclosed.

All the sciences we possess we have received from experience. By experience we know how to discharge the duties of a citizen, and to live with others in moral society; we learn to be prudent, we learn to be philosophers. By experience we acquire the arts of war and fortifications; of constructing ships, of building houses, of cultivating fields and gardens; arts which first originated from a sense of their necessity, and, being thence practiced, attained perfection through the experience of ages.

The reason why we are able to be wise by means of experience, and to refer objects to a certain court of reason and to distinctly penetrate them, and set them forth to view, is, because we have an active and most subtile principle and soul to which the subjects of our enquiry can be submitted; whereby we are enabled through the comparison and series of many phenomena to form a judgment respecting them; and, by considering their equations, similitudes, analogies, and analyses, to discover their causes by a course of geometrical and rational investigation.

THE DIFFERENCE BETWEEN MAN AND BRUTES.

Man is distinguished from brutes by reason alone; in other respects we are mere animals and organized forms. Our

senses are similar to those of brutes, and we have an interior texture not unlike theirs; our sole distinction consists in that invisible or reasoning faculty, that more subtile active principle, to which we are enabled more inwardly to refer objects, and consequently to perceive them with more distinctness.

It cannot be denied but that there is a connection between the organs of the senses and the soul, and that the affections of the organs of the senses can be in a moment transmitted to the soul by means of that connection; it is equally certain that those affections thus pass out of a more gross medium into a more subtile one, and that these mediums are contiguous and succeed each other in order. For if the affections impressed on the organs be instantly perceived in the soul, and if the organs of the senses be of a grosser substance than the soul, it follows that all perception passes out of a grosser into a more refined medium by means of contiguity and of the connection existing between them, and thus arrives at that most active principle which is the first and the last constituent of man. It follows, that when a motion passes from a grosser medium into one that is more subtile, it becomes successively more sensible; and if more sensible, then more distinct. We are distinguished therefore from brutes by this circumstance, that their perceptions do not penetrate to so subtile a medium as they do in man, but that they stop, as it were, midway, where perception is less sensible and less distinct.

But let us leave these subjects, from which we only mean to infer that we ought to be instructed by the senses, and that it is only by means of the experience conveyed from them to the mind that we are able to acquire knowledge and wisdom.

I have before observed that man is formed by the education and exercise of his faculties; that the organs which mediate between the senses and the mind are fashioned by continual culture; and that without culture and exercise those organs would be closed, as it were, and man would be like a brute. The slowness of his progress from infancy to manhood contributes in a most important and essential manner to the forming and opening of such organs or motions in the most subtile

membranes; not to mention the construction of the brain itself. For we do not arrive at adolescence till after fifteen or twenty years, or more; whilst the larger, more robust, and muscular animals arrive at maturity in between three and five years. In the meantime our organs are yielding and soft, like wax; and this enables them to receive the natural and simple motion of the elementary world, and to accommodate it to themselves in a gradual and orderly manner; so that while they are growing hard, the vestiges and elements, or figures and diversities, of the motions they are exposed to, can be fashioned within them; for the reason that while the different parts are being fitted to each other and are increasing in size, they are gradually growing hard. If therefore during this interval the parts which are as yet weak, tender, and easily affected, be agitated by perpetual and long continued motions, their tender texture, being thus constantly in motion and agitation for a long time, and always acquiring form during its growth and expansion, is rendered pliant and yielding to the innumerable different motions of this description. But, on the other hand, if an animal arrive sooner at maturity, and its parts receive a fixed arrangement before they are accustomed to such motions, they must be rendered more rigid and become in a manner callous; whence the more subtile parts, and those which approximate to the most simple, afterwards yield with difficulty to the motions impressed, and afford no passage through themselves but what is gross and obscure,—just as if the impressed motion had to pass through a thick coat. The longer therefore an animal is in arriving at maturity and the full tension of its parts, the more open may the passage to its most subtile principles or organs be rendered; consequently the more perfect will the animal become, provided the means are employed which are capable of perfecting him.

EXPERIENCE IS NOT WISDOM.

But although we acquire wisdom by experience alone, it does not therefore follow that they are the wisest who are the most experienced, or who retain a great deal in their memory. I affirm only that they are capable of becoming wise, and that

experience is the medium which leads to wisdom. For experience, considered merely by itself, is science not wisdom; it is only the threshold and entrance by which wisdom may be approached. He who is possessed of scientific knowledge and is merely skilled in experience has taken only the first step to wisdom. At this day they are reputed the most wise who are most experienced, or most versed in experiment; by making a display of which they are immediately regarded as persons of acute judgment and refined perception; and the more so if they are possessed of eloquence and an harmonious series and connection of language; still more so if they know how to captivate the ears of their auditors by a sweetness and melody of voice and accent. But those alone arrive at the goal of true wisdom who not only possess the greatest store of experience, but also have their organs so formed and disposed, from the senses even to the soul, by means of exercise, and so well and closely connected and arranged, that, whenever required, they can adduce from their treasures of experience such instances, and such only, as are adapted to the immediate occasion; by the similitude, analysis, and comparison of which, they are enabled to reason distinctly, and to arrive even at the causes of the subject of enquiry, or at the things antecedent and prior to it, by a chain of argument.

GEOMETRY.

2. The second medium leading to wisdom, by which the arcana of invisible nature may be unlocked or revealed, is GEOMETRY and RATIONAL PHILOSOPHY; by means of which we are enabled to compare our experiments, to digest them analytically, to reduce them to laws, rules and analogies, and thence to arrive at some more remote principle or fact which before was unknown.

The world itself, both the elementary and also the mineral and vegetable, is purely mechanical; and so also is the animal kingdom. The science of mechanics is the law of nature herself as she acts and moves in the elements, and it is according to this that her parts have their motion, both in the simple and in the compound; without the elements and their

regular disposition and motion, no mechanism could exist. As therefore the science of mechanics is the law of elementary nature, it follows that the world itself is governed by suitable laws and rules, and that the whole is a grand piece of mechanism; a circumstance which becomes the more evident when we observe that nothing is in a state of motion without observing some mechanical law.

When we form an idea of any body, however small, as soon as we consider it as limited we regard it as something geometrical because it possesses figure and quantity according to its peculiar dimensions. It may also be considered as subject to the laws of proportion in itself, because it possesses distance between its limits; and between one point of that distance and another there exists proportion; the case is the same in other instances. Thus not only motion, but every finite thing in a state of rest, possesses attributes which are purely geometrical. Geometry therefore accompanies the world from its first origin or first boundary to its last, and is inseparable from it; so also do the principles of mechanics, though they might be different in a world differently formed, and in elements differently formed and arranged; and thus although there may be innumerable finite worlds, nothing can exist in any of them which does not depend upon some mechanical principle, and a like principle of geometry must be common to them all. Whoever supposes the world to be any otherwise constituted must take refuge in occult qualities, only to conceal his ignorance and to preserve his reputation as a philosopher in the republic of letters.

NOT ALL THINGS IN THE WORLD ARE MECHANICAL.

But though the world is constituted in a mechanical manner, and is composed of series of finite things which have their origin by means of the most various contingents; and though the world, being of such a nature, may with the aid of geometry be explored by means of experiment and of the phenomena that exist in it; it does not therefore follow that all things whatsoever that are in the world are subject to the rule of geometry; for there are innumerable things which are not mechanical;

nor even geometrical; such as the infinite, and whatsoever is in the infinite. Geometry is conversant only with things that are finite and have limits, and with the figures and spaces thence originating, together with their several dimensions; but that which is infinite is without and above the sphere of geometry, being regarded by it as its origin and first beginning. For the finite has its origin in the infinite, without which it can neither begin nor continue to exist. To the infinite it is, that everything finite has reference, not excepting geometry. Geometry therefore is itself subservient to that most vast infinite, and owns that there is nothing in itself either similar or analogous to it.

There are also many other things the nature of which, though they originated from the infinite and began to exist together with the world, has not yet been discovered by any geometry or by any reasoning philosophy; for instance, that intelligent principle which exists in animals, or the soul, which together with the body constitutes their life. We may perhaps learn the mechanism of the different organs, and may know how they are moved by means of the different muscles, tendons, fibres, and nerves,—by the feet, arms, and other members; still, after all, what that intelligence itself is, which is in the soul, which knows and is able to determine, which knows and is able to choose, and to let one thing pass out into act and not another, we are wholly ignorant.

There are also many other things which occur in the world that cannot be called geometrical. Thus there is a Providence respecting all things, which is infinite in the Infinite, or in the Being who is Providence in the highest degree; and there follows from hence a connection or series of consequents, according to which all circumstances are determined and arranged, by causes and the causes of causes, towards a certain end. We see from experience and *a posteriori* that there is such a connection of contingencies from causes and their causates in producing a given end; but to know the nature of this connection *a priori* is not within the province of man or of geometry.

There are also innumerable other things which we in vain

endeavor to explore by geometry and *a priori*, as perhaps the nature of love. We see *a posteriori* that it consists in the connection of things; that it exists independently of the organic body; is antecedent to corporeal pleasures; and, being conjoined in the animal with intelligence, produces everything which can conduce to the preservation and continuation of its kind. The ancients regarded love as being of great moment, attributing to it the production of the universe; and many will assert that traces of intelligent love are to be found in vegetable and inanimate subjects.

There are probably infinite other things, of which we have no knowledge whatever, that own no obedience to the known laws of mechanics. Hence we may conclude that there are qualities in the soul that are still very remote from mechanical apprehension; so that did we even know all the mechanism and geometry of the visible world, of animal organization, vegetation, or any other department of nature, there still are infinite things with which we are unacquainted.

THE RATIONAL PRINCIPLE.

But since the intelligence in the soul is not mechanical, but only the mode in which the soul operates, we next enquire what that is in the soul which is not mechanical, and what is its essential rational and intelligent principle which is not subject to known laws. The rational principle in the soul does not consist in knowing many things which the world naturally exhibits and represents to the senses; nor in knowing the figures and spaces in which motion terminates; nor in knowing the proportion between figures and spaces and the other rules and proportions of motion by which the world acts and pursues its phenomena. But the rational principle consists in knowing, and at the same time in being able to arrange into such order and connection the reasons of proportional facts known from the world, as to view their analogy; yet this presupposes an active principle or a certain force impelling into motion all those things which inhere, as it were, scientifically in its organs; that is, it presupposes a soul. The rational principle in the soul, therefore, is the continual analysis of those

things which are likewise scientifically inherent in its organs.

REASON.

3. The third means by which we may arrive at a true philosophy and at the knowledge of occult nature is the faculty of reasoning. Let a man possess the utmost store of experimental knowledge, and be at the same time a complete geometer, and yet suppose him to be deficient in the faculty of just reasoning, or of comparing the several parts of his knowledge and experience, and representing them distinctly to the soul; he can never attain to the mysteries and inward recesses of philosophy. Knowledge without reasoning,—a heap of many things in the memory without judgment to separate and distinguish them, and without the talent of deducing the unknown object of inquiry from certain known data, by means of the rational or geometrical analogy,—in a word, the possession of the means without the faculty of arriving at the end, do not create a philosopher. The faculty of reasoning justly, and of arriving at the end in view by the proper means, which are experience and geometry, is the characteristic of the rational man.

(To be continued.)

SWEDENBORG'S DOCTRINE OF CORRESPONDENCES.

BY THE EDITOR.

Students familiar with Swedenborg's writings are so accustomed to the meaning attached by him to the word Correspondence, that it is only by a distinct effort they realize how far removed that meaning is from the popular conception of the word. Swedenborg's meaning, namely, that the word expresses the relation between a spiritual cause and its natural effect, has indeed in late years found its way into the dictionary; but the idea itself is still foreign to the mass of men,—to whom Correspondence means nothing more than letters or the writing of letters, friendly intercourse, agreement, suitability, adaptability.

CORRESPONDENCES A LOST SCIENCE.

The meaning of the word is new and unknown because the idea it expresses is even more unknown. And this is the point we would emphasize, the point, namely, that in his doctrine of Correspondence Swedenborg put forth a doctrine that was absolutely unknown to his day, and was as foreign, to the thought of that day as it is to ours. He presents this doctrine in its fulness in his theological writings; but it is also set forth in the philosophical works. And the doctrine, as laid down in the latter, and as specifically set forth in the posthumous work, *HIEROGLYPHIC KEY TO NATURAL AND SPIRITUAL ARCANA BY WAY OF REPRESENTATIONS AND CORRESPONDENCES*, is the same as that which is unfolded in the theological works,—though, of course, in less developed form; yet, in all essentials, it is the same doctrine.

Search the literature of Swedenborg's day, and you will find no such doctrine. It is indeed involved in some of the writings of the early Greek philosophers; yet none but Swedenborg had seen it there. There is an appearance also, as if some dim notion of such a doctrine was possessed by one or two of the early Christian Fathers, by the learned Maimonides, and perchance by others; but it is merely an appearance, and, moreover, an appearance seen only by those familiar with Swedenborg's doctrine of correspondence. The idea held by the writers to whom we have just made reference was not the genuine idea of correspondence, the relation between cause and effect, the spiritual and the natural; but it was rather the idea of metaphor, type, imagery, figure of speech, as applied to the interpretation of Scripture; and even when the types were respectively spiritual and natural, yet they were not connected in the minds of the writers as cause and effect. "Entirely lost" had become the science of correspondence,—lost long before Swedenborg's day; and it was this "lost science" that Swedenborg was led to find; a science, not of types or metaphor, but of the actual and living relation between spiritual causes and their natural effects, between the spiritual world and the natural, between the soul and the body.

CORRESPONDENCE AND METAPHOR.

As to the difference between Correspondences as laid down in Swedenborg's writings, and the Metaphor or Type of common speech, we can give no better explanation than that presented by Robert Hindmarsh in the preface to his English translation of HIEROGLYPHIC KEY.

Correspondence in general (he says) may be defined, as the relation subsisting between the essence of a thing and its form, or between the cause and its effect. Thus the whole natural world corresponds to the spiritual world; the body of a man with all its parts corresponds to his soul; and the literal sense of the Word corresponds to its spiritual sense. So that wherever there is a correspondence there is necessarily implied such a union between two things as only takes place when the one is derived from the other, in the same manner as an effect is derived from its efficient cause, or as speech is derived from thought, and the gestures of the body from the affections of the mind; in all which cases the exterior forms can no more be separated from the interior essences without losing their existence, than the body of a man can be separated from his soul without death. Such is the nature and power of correspondences. Let us now see whether the same can be said of mere figure and metaphor.

A mere figure or metaphor is the resemblance in some certain way which one thing bears to another, not according to the true nature or fitness of things so much as by the arbitrary choice of a speaker or writer who is desirous of illustrating his subject and rendering it familiar to the comprehension. Consequently there is no necessary union between the subject and the figure, nor is the one an effect of the other, or in any wise dependent on its existence and subsistence, as is the case in all correspondence. An example will illustrate the truth of my observation. Virgil, in his *Aeneid*, *lib.* 2, likens the destruction of Troy with her lofty spires, to the fall of an aged oak on being hewn down by the woodman's hatchet. This is a simile or figure, but not a correspondence; for there is no necessary connection between the city of Troy and a mountain oak, nor between her lofty spires and the wide extending branches of a tree. The one is not within the other as its life and soul; nor can the relationship subsisting between them be considered like that of cause and effect, essence and form, prior and posterior, soul and body, which nevertheless, as before observed, is the case with all true correspondences.

The difference between a mere figure and a correspondence may again appear from the following consideration: A mere figure or simile is the resemblance which one natural object or circumstance is supposed to bear to another natural object or circumstance; whereas

a correspondence is the actual relation subsisting between a natural form and a spiritual essence; that is, between outer and inner, lower and higher, nature and spirit, and not between nature and nature, or spirit and spirit. This distinction should be well attended to. The language of correspondence is the language of God Himself, being that in which He always speaks both in his Word and in his works; but figure and metaphor, together with the language of fable, are the mere inventions of man which took their rise when the divine science of correspondences began to be lost in the world.

UNITY BETWEEN THE EARLIER AND THE LATER SCIENCE.

The definition of correspondences given in this excerpt, applies more especially to the science of Correspondences as laid down in Swedenborg's theological works; but that it applies also to the Doctrine of Correspondences as given in the philosophical works will be evident to any student of the *HIEROGLYPHIC KEY*. Mr. Hindmarsh himself was indeed so impressed with the latter work that he calls it an "introduction to the science of correspondences," and he even suggests that "it contains so many grand and sublime conceptions" as perhaps to give "sufficient evidence of divine inspiration." But that the work was written before Swedenborg's illumination is quite evident from its whole style, and moreover can easily be shown.

The student will naturally be curious to enquire as to what distinction is to be made between the doctrine presented in the *HIEROGLYPHIC KEY*, and the science given in the theological writings. We propose speaking about this distinction; but first we would note the points of agreement between the two doctrines:

First. Quite apart from those naturally perceived correspondences which are matters of common speech, such as black and falsity, light and truth, etc., the correspondences of the *HIEROGLYPHIC KEY* are, in innumerable cases, the same as those given in the later works,—and this in cases which would seem to have been brought forward only as the result of the application of a specific doctrine. Thus aura, rational mind, divine spirit (n. 28) is the same as atmosphere, the spirit of man with what proceeds therefrom, and the divine pro-

ceeding; conatus, will, providence (n. 2, 4) and direction, intention, divine disposition, are the same as the conatus to uses that lies in all nature, the endeavors of the human will wherefrom come the appearances of the spiritual world, and the Divine Love and Wisdom which rules the universe. A like similarity to the examples of correspondences as given in the theological works is seen in the further examples from HIEROGLYPHIC KEY, expansion, swelling, pride, ambition (n. 68); fire, anger, zeal, just grief (n. 68); sun, soul, God or the sun of wisdom (n. 28); world, man, heaven (n. 11).

Second. In the philosophical works, as in the theological, correspondences are set forth as being the actual living relation between spiritual cause and natural effect, or between the spiritual world and the natural. Thus we read:

There is a perpetual symbolical representation of spiritual life in corporeal life; as likewise a perpetual typical representation of the soul in the body. . . . In our Doctrine of Representations and Correspondences we shall treat of both these symbolical and typical representations, and of the astonishing things which occur, I will not say in the living body only, but throughout nature, and which correspond so entirely to supreme and spiritual things that one would swear that the physical world was purely symbolical of the spiritual world, insomuch that if we choose to express any natural truth in physical and definite vocal terms, and to convert these terms into the corresponding spiritual terms, we shall by this means elicit a spiritual truth or theological dogma in place of the physical truth or precept, although no mortal would have predicted that anything of the kind could possibly arise by bare literal transposition (*An. King.* 293 and note u).

Spirits are above nature and yet they thoroughly understand all particulars that pertain to nature. It follows then that there is some correspondence and harmony between all things, that is, between natural things and spiritual, and *vice versa*; or, that in universal nature there is not a thing that is not a type, image and likeness of some one among spiritual things, all which are exemplars. Otherwise no spiritual intelligence could ever know such things as are below itself; and yet it knows them both of itself and in itself. The Egyptians, moreover, seem to have cultivated this doctrine and to have signified these correspondences by a vast number of different hieroglyphics expressive not merely of natural things but also and at the same time of spiritual (*Hier. Key* n. 53).

How utterly at one is this teaching with the doctrine as set forth in *ARCANA CÆLESTIA*: In the natural world and in its three kingdoms, there exists not the least thing which does not represent something in the spiritual world, or which has not something in that world to which it corresponds. . . . The reason is because the causes of all things natural are from things spiritual, and the principles of their causes from things celestial; or what is the same thing that all things in the natural world derive their cause from truth which is spiritual and their principle from good which is celestial, and that natural things proceed thence according to all the differences of truth and good which are in the Lord's Kingdom, consequently from the Lord Himself who is the source of all good and truth" (2992-3). We do not mean that the two passages agree in every detail. The agreement is, in general, that the things of the spiritual world are the causes of things in the natural world; and that, in the natural world, these causes set themselves forth to view so as to be seen as spiritual truths by those who know the doctrine of correspondence, and as natural types or simulachra, by those ignorant of this doctrine. But if we consider the whole teaching of the philosophical works we shall see that the agreement with the theological works, and, specifically, with the passage just quoted from the *ARCANA*, goes much further; that Swedenborg had more in mind than the bare correspondence between the two worlds; that he had in mind, namely, a three-fold series, which will be found to be the same as the natural, the spiritual or truth, and the celestial or good, mentioned in the passage quoted from *ARCANA CÆLESTIA*. Thus,

Third. The philosophical works and the theological, agree in this, namely, that the doctrine of correspondences involves a trine; in other words, that correspondence lies between Ends in God, causes in the spiritual world and in the human mind, and effects in nature.

In the *HIEROGLYPHIC KEY* which is written with the expressed purpose of giving the doctrine of correspondences and representations, this is seen to be quite evidently the author's conception. Wherever possible he has a trine of correspond-

ences, the physical world, the rational or intellectual world where are the things of the spirit, and the Divine. Thus we have "conatus, will, Providence," and "Nature, the human mind, God" (n. 2); effect in nature, end in human minds, the end of ends, or the love of our salvation in God (n. 6); direction in nature, intention in the mind, Divine disposition in God (n. 15); the natural sun, the soul, the sun of wisdom or God (n. 28). And so in many other examples. The teaching is, moreover, specifically stated. For we read:

Nature was formed and created for the promotion of the ends of Divine providence; which is the cause of correspondences and representations. Nor can the end of creation be anything else than a universal society of souls in which God may be regarded as the End of all (n. 8).

All things Divine are exemplars, things intellectual, moral and civil (*i. e.*, things pertaining to the rational mind) are types and images, while things natural and physical are simulachra. Thus exemplars, types and simulachra must by all means represent each other. There is also a mutual correspondence and harmony; for one is recognized by the other, and one recognizes the other, as the respective of itself (n. 9).

Fourth. The philosophical works agree with the theological, in teaching that causes descend into effects by discrete degrees, and thus that correspondences can be known only by a knowledge of degrees. Thus we read in the philosophical works:

Physical or natural, moral and spiritual truths mutually correspond to each other with a difference only of perfection, as will be seen in the doctrine of correspondences; wherefore, since the one is in a superior sphere and the other in an inferior sphere, similar significative formulas are not suitable to them, but they ascend to a superior nature (*Senses* 631).

Such is the co-established harmony of all things in the same series (of end, cause and effect) that they mutually correspond to each other without any difference but that of perfection according to degrees (*Econ. An. King* n. 625).

We have the very same teaching in DIVINE LOVE AND WISDOM, n. 199, which shows that "all perfections increase and ascend with degrees and according to them."

Again we read in the *ECONOMY* that the Rule for finding the "rational causes" of things, that is, the superior or spiritual things of which they are the physical manifestation, is

First to enquire what things, in the superior degree, correspond to those which are in the inferior, and by what name they are to be called; in other words, what things in one and the same series, mutually succeed each other, are dependent on and have respect to each other by degrees; for so separate from each other do they appear, that without the most internal and analytical intuition, it seems impossible that the things of a superior degree should be recognized and acknowledged as the superior forms of things inferior; for to the sensory of the inferior forms they are incomprehensible (1 *E. A. K.* 623-626).

In other words, unless the things of the inferior degree were distinct from those of the superior, they could not be compared with a substance which subsists by itself (n. 589), but would be the same with the superior ones taken in the aggregate or collectively (n. 629, 630). In order then to ascertain and know what that is in a superior degree which corresponds to its proper inferior, rules must be discovered to guide us in pointing it out (1 *E. A. K.* 648).

The following points seem sufficiently established, by the excerpts we have quoted from Swedenborg's philosophical writings, namely:

1. That in these writings Swedenborg lays down the same or similar correspondences as are given in his theological writings.
2. That, by correspondences he understands the relation between superior or spiritual cause and natural effect, or between the spiritual world and the natural.
3. That in correspondences he recognizes a trine of ends in God, causes in the spiritual world or world of mind, and effects on earth.
4. That the relation between correspondents is one of discrete degrees, and that correspondences can be known only by a knowledge of discrete degrees.

DIFFERENCE BETWEEN THE EARLIER AND THE LATER SCIENCE.

Still despite essential similarity, there is also a manifest difference between the doctrine of Correspondences as given in the theological works, and as given in the philosophical. In

the former the doctrine is more fully developed ; it deals with interior things more particularly ; and its statements are confirmed by actual observation in the spiritual world. Swedenborg sees the causes of things not only with the sight of the understanding, but also with that sight of the spirit by whose opening, there were revealed to him the real appearances of the spiritual world ; and this opening of the sight of his spirit was the last of that long preparation whereby he was finally led to receive the doctrines of the New Church from the Lord alone.

In the theological works the science of correspondences is given *a priori*, and as from above ; as a revelation from God and confirmed by heaven. In the philosophical works it is presented with equal positiveness as to the truth of the doctrine ; but it is presented as a new doctrine which the author has seen as a result of long and careful study and observation ; as the fruit, not of direct inspiration from heaven, but of human intuition enlightened by reason and guided by experience. The doctrine is presented with utmost conviction as to its vast importance,—the conviction of rational sight ; but there is only a general view of the spiritual wonders into which this science is to lead. In the theological works those wonders are all revealed, and the science of correspondences is delivered as the Key by which the fulness of this revelation may be received. In the earlier works Swedenborg was led by his new doctrines to see that there is a spiritual sun, and spiritual light and heat which enlighten and warm the spirit of man, and which angels and rational minds enjoy. This he teaches clearly and emphatically, and there can be no doubt as to his positive conviction. But his statements are the conclusions of enlightened reason, and though true and convincing, are yet seen to be but shadows and dim visions of the truth, when compared with the same truth as delivered in the writings of the revelator. The truth is the same,—there is a spiritual sun giving forth spiritual heat and light ; but how different seems that truth, with what difference of power does it come, with what new particulars is it filled when seen not only as the rational conclusion of an enlightened understanding, but also as a truth of revelation confirmed by actual sight !

SWEDENBORG'S DEVELOPMENT OF THE SCIENCE.

The first means whereby Swedenborg was led to the formulation of his doctrine of correspondences, and of the intimately related doctrines of order and of series and degrees, was his acknowledgment that all nature has her origin in God, and that all that proceeds from God and manifests itself in nature, proceeds not through a vacuum, not by a fiat that knows no laws, but by a regular and orderly series of creations whereby that which is Divine becomes more and more tempered, and takes to itself successive means for operations on lower planes. Swedenborg early saw that in every created thing there was a series of more and more interior operations; and that all such series proceed according to a law and order impressed on creation by God; and finally that the use existing in the last of the series was but the ultimation of the end and the cause existing in the first and intermediates of the same series. Hence it was clear to him there was a Doctrine of series and degrees; a doctrine of order; a doctrine of correspondences and representations.

In his cosmological works he lays down the doctrine of series and degrees as applied to creation; in the physiological writings he gives it as applied to the kingdom of the soul. In the *PRINCIPIA* his series is a series of finites and elementaries or atmospheres whereby the creative love and wisdom of God descended to form matter; in the physiological works it is a series of bloods whereby the soul manifests her presence and performs her works.

In the *PRINCIPIA*, so far as we are aware, there is no specific mention of a doctrine of series and degrees, of order, of correspondence. Of the doctrine of correspondence there is not even a specific suggestion. The reason is plain. The *PRINCIPIA* is engaged in laying down the series of creation itself, and the moments, degrees and order of this series; it is engaged in describing the elementary or atmospheric kingdom, the kingdom of Divine proceeding, whereby uses descend to be finally re-presented in the ultimate world. The doctrine of correspondences comes to view not in the kingdom of uses proceeding from God by means of atmospheres, but in the king-

dom where uses proceeding are finally clothed with substances and matters of the earth; not in the elementary kingdom, but in the kingdom of ultimate nature where those uses which have descended according to degrees, at last stand forth to view. It is in this ultimate kingdom that correspondences and representations first become revealed.

Therefore when in the physiological works Swedenborg takes up the investigation of the crowning work in the ultimate sphere,—the human body—he commences to develop the doctrine of order, degrees, correspondences of which, indeed, for the first time he makes specific mention. He saw that what was true of the elementary kingdom is true also of the supreme kingdom of uses, the human body. If life from God proceeds by degrees to the creation of a world-theatre representing His Divine Wisdom and Love, so also must it proceed in the formation of the human body. Hence the conclusion that the body is not merely an organism subject to the action of the ultimate atmosphere; but that within it are more and more interior parts which are subject to the operations of more interior atmospheres; and this even to the inmost organism, the human soul, which, above the sublunary sphere, is subject only to the operation of the first aura in the series of creation from God. Swedenborg saw also that as the activities of substances in the material world produce the forms of uses that appear before our eyes, so the activities of the more interior degrees of substances must likewise produce uses,—uses which are not manifest to the eye of the body, but only to the eye of the spirit; that as the Creator operates by atmospheres to give heat and light to the body, so does He also operate to give superior or spiritual heat and light to the interior planes of life whose activities and uses are the perceptions and thoughts, the loves and ambitions of the rational mind.

Hence in the first of the physiological works, the *ECONOMY OF THE ANIMAL KINGDOM*, Swedenborg announces his new doctrines, of order, degrees, correspondences, and the evidence clearly indicates that the author made use of these doctrines in the development of the wonderful series of conclusions which enrich the pages of the *ECONOMY*.

THE FRUITS OF THE SCIENCE.

Swedenborg saw the rich fruits to be gathered from the cultivation of these new doctrines, especially from the doctrine of correspondences and representations which is, as it were, the crown of the other doctrines :

"There is (says he, in a passage we have already fully quoted) a perpetual symbolical representation of spiritual life in corporeal life; as likewise a perpetual typical representation of the soul in the body;" and he continues that if, in the light of the doctrine of representations and correspondences, "we choose to express any natural truth in physical and definite vocal terms, and to convert these terms only into the corresponding spiritual terms, we shall by this means elicit a spiritual truth or theological dogma in place of the physical truth or precept,—although no mortal would have predicted that transposition." . . . He adds: "I intend hereafter to communicate a number of examples of such correspondences, together with a vocabulary containing the terms of spiritual things as well as of the physical things for which they are to be substituted" (1 *Anim. King.* 293 and note u; 453, note f).

This intention is fulfilled in **HIEROGLYPHIC KEY**, where are many "conversions" of physical terms into spiritual,—conversions productive of remarkable and illuminating conclusions. It was by this means that Swedenborg was able to show that there is a spiritual sun, a spiritual light and darkness, and heat and cold, a spiritual eye and ear, nay, spiritual reins and a "spiritual searching of the reins" (1 *A. K.* 293, note u).

But this by no means sets forth all that he hoped to discover by his new doctrines. He hoped by them to reach to the soul herself, to see her in her inmost penetralia, to behold her interior operations, myriads of which present but a **single** movement before the eyes of the body. He hoped to search the operations of the mind and the laws of these operations. In short, he looked to the opening up of a new world, the world of the mind and spirit of man.

"We may not climb (says he) immediately from effects to principles, from the body to the soul, and from the material world to the immaterial. And, therefore, in order to this ascent I have been obliged to conceive, as it were, from an ovum, to form and bring forth new doctrines which shall lead me from lowest things to higher; doctrines

which I term the doctrine of form, the doctrine of order and degrees, . . . the doctrine of representations and correspondences, and lastly the doctrine of modification (i. e., of the modes whereby a superior degree operates into and by means of an inferior). All these doctrines must first be laid down and explained before I dare to mount or attempt that ladder which leads from earth to heaven. But O, how lowly placed are we inhabitants of earth, and far removed from such sublime subjects! And yet we aspire to climb at once to the very heights, though in our path lie infinite things which must first be explained and revealed before we can reach even the threshold of this temple" (*Generation* 357, 167).

Still more fully are his ambitious hopes set forth in the **ANIMAL KINGDOM**:

"I have ventured to attempt this method (the analytic to be followed by the synthetic) of discovering truths at present deeply hidden under a veil of hypotheses, and the proper time has arrived; for a rich store of experience is at hand; an accumulated heap sufficient to enable us to build a palace; a luxuriant field where our sickles may reap an abundant harvest; a table where we may enjoy the most sumptuous banquets. Nor do I think we ought to wait any longer lest haply experimental knowledge should be overtaken by age, night and oblivion; and the arts and sciences be carried to the tomb; for unless I mistake the signs of the times the world's destinies are tending thitherwards." Then follows a summary of the plan for the **ANIMAL KINGDOM** to be completed in seventeen parts.

Speaking of part twelve he says: "I purpose afterwards to give an introduction to Rational Psychology consisting of certain new doctrines through the assistance of which we may be conducted from the material organism of the Body to a knowledge of the Soul which is immaterial; these are the Doctrine of Forms; of Order, and Degrees; also of Series and Society; of Influx; of Correspondence and Representation; lastly, the Doctrine of Modification.

"From this summary or plan the reader may see that the end I propose to myself in the work is a knowledge of the soul, since this knowledge will constitute the crown of my studies. This, then, my labors intend, and thither they aim. . . .

"The soul has enjoyed the profound attention of nearly all human minds ever since the infancy of philosophy, and still holds them in suspense, division and perplexity. But as yet her mode of being and her nature are almost absolutely unknown; and such is the general state of doubt and hesitation, as to preclude all distinct thinking. This has given rise to so many obscure guesses on the subject,—it has caused so many clouds to collect around it, that all hope of discovery

is nearly at an end. In order therefore to follow up the investigation and to solve the difficulty, I have chosen to approach by the analytical way; and I think I am the first who has taken this course professedly.

"To accomplish this grand end I enter the circus, designing to consider and examine thoroughly the whole world or microcosm which the soul inhabits; for I think it is in vain to seek her anywhere but in her own kingdom. . . .

"But since it is impossible to climb or leap from the organic, physical or material world,—I mean the body—immediately to the soul, of which neither matter nor any of the adjuncts of matter are predicable . . . it was necessary to lay down new ways by which I might be led to her and thus gain access to her palace,—in other words, to discover, disengage and bring forth by the most intense application and study certain new doctrines for my guidance, which are, as my plan shows, the doctrines of forms, of order and degrees, of series and society, of communication and influx, of correspondence and representation, and of modification; these it is my intention to present in a single volume under the title of *An introduction to Rational Psychology*" (1 A. K. 15-17).

The plan here referred to is the "Index of Contents of the whole work," which the author printed in Volume I. of *ANIMAL KINGDOM*, and which was intended to cover the whole subject of the soul and its kingdom from the organs of the body and brain, to the soul itself and its intercourse with the body. The "new doctrines," including the doctrine of correspondence, were to form Part XII., entitled *Introduction to Rational Psychology*. Parts I. to XI. were to treat of the body, the brain, and the fibre and its diseases, and Parts XIII. to XVII. of the senses, memory, the mind and the soul. It was thus for the elucidation of these latter subjects that the new doctrines were especially demanded and designed.

THE EXPOSITION OF SCRIPTURE.

But Swedenborg seems to have foreseen a use and result from his new doctrines, especially from the doctrine of correspondences, wider and more universal than even the discovery of the soul. The doctrine was to lead him to the realm of theology, and to the unfolding of the Word of God. Indeed, in a passage from *ANIMAL KINGDOM*, quoted above, the doctrine of Correspondence is used for the specific purpose of

"pointing out the spiritual sense of searching the reins" (1 A. K. 293, u). In this same passage the author also states his intention of publishing "a number of examples of such correspondences, together with a vocabulary containing the terms of spiritual things and of the physical things for which they are to be substituted." This "vocabulary" was afterwards written under the title *HIEROGLYPHIC KEY*. In *WORSHIP AND LOVE OF GOD* the author quotes verbatim from this work, (then unpublished), in order to show how "by natural and moral truths by means of transpositions, we are introduced into spiritual truths, and thus from one paradise into another." By these examples of the application of the doctrine of Correspondences, thus adduced from *HIEROGLYPHIC KEY*, Swedenborg shows plainly the existence of the spiritual sun, and of spiritual heat and light; and he demonstrates the universal oneness of the Kingdom of Heaven inspired by love in God (*W. L. G.* 55 s (cf. *H. K.* 48, 37); 65 g (cf. *H. K.* 45).

At this point let us note a natural, but none the less interesting distinction between the philosophical doctrine of correspondence and the theological doctrine. In the former all the correspondences and representations are natural; they include the things of the sea, of the earth, of the auras, of the human mind; but there is not a word concerning those artificial correspondences, or, rather, to speak correctly, of those representations and significatives with which the Jewish Word abounds. We refer, for example, to the representation of the persons mentioned in the Word, and the signification of the various sacrifices and the modes of performing them,—all of which matters are dealt with in the theological writings alone.

There is no doubt, however, that Swedenborg hoped, by means of his doctrine of correspondence and representation, to interpret and unfold the Scripture themselves; and, further, that for this purpose he saw the necessity of enlarging his doctrine of correspondence so as to include the "types" of the Jewish Word, or, in general, the "representatives" and "significatives" so often spoken of in the theological works, and which are to be distinguished from natural correspondences.

A hint, nay, more than a hint, of the author's intentions,

hopes and aspirations, is given in the closing paragraph of HIEROGLYPHIC KEY :

Exemplars are in the spiritual world ; images and types are in the animal kingdom ; but simulacra in nature. There are many species of representations or correspondences. The FIRST species is to be called *Harmonic correspondence* such as exists between light, intelligence, wisdom. . . . The SECOND species is *Allegorical correspondence*, and is formed by similitudes. It is in this way that we are wont to express spiritual things naturally, for all spiritual words are occult qualities. In the Scriptures this species of correspondence occurs quite frequently. The THIRD species is *Typical correspondence* and is formed by so many likenesses, as in the Jewish Church wherein is represented Christ and the Christian Church, and wherein, in the latter church, is represented the Kingdom of God and the heavenly society. The FOURTH species is the *Fabulous correspondence* in use among the ancients . . . of this nature also are the representations of the poets and of dreams. It is right to believe that the universal world is wholly filled with types, but that we know very few of them. . . . It is allowable to thus interpret Sacred Scripture ; for the Spirit speaks naturally and also spiritually (*H. K.* 67).

CONTINUATION OF HIEROGLYPHIC KEY.

After writing HIEROGLYPHIC KEY,—which appears to be an uncompleted work, Swedenborg actually began to “interpret Sacred Scripture” in the light of the doctrine of correspondence, and his attempts are preserved to us in MS. form in Codex 36. In that codex is a little work on Correspondences which is introduced by a short paragraph whose opening words are almost identical with the closing words of HIEROGLYPHIC KEY. The paragraph reads :

The spirit speaks of natural things spiritually, and the natural man of spiritual things naturally ; for in order that the natural man may understand spiritual things, the spirit is wont to speak naturally concerning things divine. The spirit understands a speech which expresses spiritual things naturally, but it is the more affected in proportion as we more fully abstract our thoughts from things material. To speak purely spiritually is not human, nor to think purely spiritually, for something natural or corporeal is ever mingled with the spiritual. Hence it is clear that angelic speech is purely spiritual which is not expressed orally by the tongue, or if expressed is not understood.

From ignorance of the signification of spiritual words which are

tacitly either occult qualities, or involve the universals of things natural, arise hosts of controversies, and sinister interpretation, especially of Sacred Scripture.

After this introduction, there follow chapters on "Harmonic Correspondence," "Parabolic or Allegoric Correspondence," "Typical Correspondence," "Fabulous Correspondence and that of dreams." It will be observed that the order of this treatment is identical with the order in which the four kinds of correspondences are enumerated in the last paragraph of HIEROGLYPHIC KEY,—a fact which makes it tolerably certain that these notes on Correspondences contained in Codex 36 are a continuation of the HIEROGLYPHIC KEY. In our edition of the latter work we hope to include these notes, which will fill many pages.

The introductory passage, which we have quoted from Codex 36, shows that what follows is an application of the Doctrine of Correspondences to the unfolding of Scripture. Let us now examine the nature of this application.

Under "Harmonic Correspondence" Swedenborg quotes over a hundred passages of Scripture from Genesis to Galatians, all illustrative of a correspondence such as lies between *light, intelligence, wisdom; effect, will; modification, sensation, imagination* (H. K. 67). The following citations will serve to show the nature of the quotations:

The voice of thy brother's blood crieth unto me from the ground, Gen. iv. 10, for the soul; the language is entirely natural. Others render it bloods. *Ye shall not eat flesh with the blood of its soul*, Gen. ix. 4.

To all eternity, for the duration of the world, Gen. ix. 12; the language is entirely spiritual.

In the breastplate of judgment is placed, or in the Urim and Thummim, *clarity and integrity*; or wisdom and intelligence, Ex. xxviii. 30; Lev. viii. 8.

Under Parabolic or Allegoric Correspondence about fifty passages are cited, being for the most part an enumeration of the similitudes used in the parables.

The chapter on Typical Correspondence is by far the longest, containing about a hundred and fifty citations from Scripture:

That circumcision is a sign of the covenant, Gen. xvii. 11, 14, 23, 24; a type for spiritual circumcision.

The sacrificing of Isaac, that he carried the wood, Gen. xxii. for the Messiah.

Their civil laws, Ex. xxi-xxiii, are also types of the future church, if all were to be examined.

Every structure of the tabernacle wherein God was to dwell signifies something, Exod. xxvi and xxvii; also Aaron's garment, Ec. xxviii, and the Urim and Thumim (xxviii). The shewbread and the sacrifices, how they were to be done, are also types, Ex. xxix, etc.

Jehovah promises long life, possession of the land, especially Canaan, etc. All these are types of eternity and heaven; for God spake naturally; He understood spiritually.

Under Fabulous Correspondence and that of dreams are gathered together over thirty passages from Scripture,—being those which speak of miraculous events or of dreams:

And he took one of the ribs, the body being pressed together in the place thereof, Gen. ii. 21, 23. *The serpent was the most subtle of all*, Gen. iii, for the devil or concupiscence. *I will place enmity between thee and the woman, and between thy seed and her seed, and it shall bruise thy head and thou shalt bruise his heel*, Gen. iii. 15. *He sent cherubim, and a waving flamy sword*, Gen. iii. 23, perhaps heat. These things are expressed by representations such as were in use among the ancients, who adumbrated affairs and deeds in similitudes. It is enough that God has revealed those things that are necessary for the body and soul, but it has pleased Him to involve history in like signs, which yet contain the truths of things.

These four chapters are followed in the MS. by other chapters, entitled "Explication of Sacred Scripture"—explaining in some detail several passages; "Representation of Oracles,"—enumerating the oracular sayings of Jacob in his prophecy concerning his twelve sons, and other like prophetic utterances; "Correspondence of Human and Divine Actions." Under the last heading we read:

There are infinite correspondences between human actions and Divine; in which correspondences consist the laws of Divine Providence; as, that God forgives us our sins if we forgive those who sin against us; that he who honors his father will have long life; that he will be rich who has helped the poor, etc., etc. The books of the Old Testament are full of such correspondences, especially the Psalms of David

and the Proverbs of Solomon. . . . If any one now should write like David he would be reckoned as a man of no learning, but merely pious and simple. If one should speak like Solomon he would be reckoned as an initiate moralist, and as not having arrived at the threshold of modern wisdom; if like Isaiah, Jeremiah, Ezechiel, etc., he would be reckoned as playing with fantasies, and like a man, fresh from sleep, relating his dreams with parables. If one should speak like Paul, he would be reckoned as speaking many imaginary and typical things, with some confidence in himself; nay, if one should speak like Christ Himself, he would be reckoned as saying simple and elementary matters, under which, by reason of the parables, we imagine mysteries to lie.

It is clearly evident from the whole of this treatise or sketch on Correspondences, that Swedenborg, having completed his physiological studies, having published the *ANIMAL KINGDOM*, and written the *RATIONAL PSYCHOLOGY*, was now about to enter into the mysteries of the Word, to take the Hieroglyphic Key, which he had forged, and with it to unlock the door of revelation. He had seen the presence of God in His universe; the presence of the soul in the body; and now he girded his loins for the investigation which was to end in the vision of the Divine Wisdom in the Word.

THE PLACE OF THE SCIENCE IN SWEDENBORG'S PREPARATION.

But the closing of the period of Swedenborg's preparation was at hand; his goal was indeed to be reached,—but by means not then dreamt of; means more marvelous than assiduous study and reflection, though not displacing these; and whose fruits were not only the fulfilling, and more than fulfilling, of the aspirations of the man, but were also the Crown of the Revelations of God.

The *HIEROGLYPHIC KEY* and the sketch chapter on Correspondences were written in 1742-3. In 1743 the Lord appeared to Swedenborg, and he began to have remarkable dreams, in the interpretation of which he seeks to use his doctrine of Correspondence. In 1745 the Lord again appears to him, and gives to him the office of Revelator. From this time on he is in constant intercourse with spirits and angels. He beholds now the realities of those correspondences to which his "new doctrines" had led him.

But note here the all-important circumstance that he did not

enter this spiritual world ignorant or unprepared. For many years his thought had uttered, and his mind had been formed by those new doctrines,—the doctrines of Order, of Series and Degrees, of Correspondence, of Modification—the understanding whereof he regarded as essential to all progress in the work of penetrating into the arcana of nature and the mysteries of theology. And when the last of the preparations for his mission was fulfilled, when the time came for the opening of his sight into the spiritual world, that time found his understanding “prepared to receive the doctrines of the New Church” (*T. C. R.* 779). He came to the spiritual world not a stranger to its laws; not as one ignorant; but, rather, as one who by his previous philosophical thought was able quickly to grasp, rapidly to learn the new things that were opened before him. And he found that those “new doctrines” which he had discovered by the aid of rational intuition fortified by science and experience, were verily true; those doctrines, of whose truth he had previously been convinced from the light of reason and the power of intuition, he now saw in the light of heaven and from the perception of inspiration. No repudiative change was required in his principles and doctrines, but only development. The doctrine of degrees, of correspondence, is the same in the philosophical writings as in the theological; no change in the conceptions of the former was required to meet the inspiration of the latter. But in the latter the full truth, the full meaning and reality and scope of the doctrines of the former is set forth. It could be set forth because it was seen; and it was seen because the mind of the Seer had been prepared for the seeing.

Without this preparation Swedenborg would have entered the spiritual world unprepared to understand the new marvels; unprepared to receive the new doctrine “in his understanding;” unprepared to publish it to the world. But he was prepared, and especially by his new marvellous fundamental doctrines. The eyes that were opened to the spiritual world were the eyes of a wise philosopher, to whom the light of heaven brought, not confusion, not rejection of previous conceptions, but the fuller perception of truths long familiar, but hitherto seen, as it were, in the shade.

HIEROGLYPHIC KEY
TO
NATURAL AND SPIRITUAL ARCANA
BY WAY OF
REPRESENTATIONS AND CORRESPONDENCES.
BY EMANUEL SWEDENBORG. (*Continued.*)

EXAMPLE IX.

30. Perfect order constitutes harmony; this brings forth beauty; which two redintegrate and preserve nature. But imperfect order produces disharmony; this brings forth unshapeliness; which two pervert nature and destroy it.

The affection of true harmony brings forth delight, and this, joy, which two recreate, and N. B. vivify the animus and mind. But disharmony brings forth undelight, and this sadness, which two have an evil effect on the mind and animus and extinguish them.

Love of the highest good brings forth happiness, and this heaven, which two ren- N. B. der the soul blessed, and exalt its spiritual life. But love of evil brings forth unhappiness, and this, hell, which two condemn the soul and spiritually kill it.

31. *Correspondences.* I. AFFECTION and LOVE. For every grateful affection of the animus may be called its love. But properly speaking, love is a spiritual word, to which corresponds concord, unanimity, and, in the class of natural things, conjunction and connection. This, however, does not prevent love from also corresponding to affection, when the subject

under consideration is harmony within which is a concordance and connection of this kind. 2. TRUE HARMONY, HIGHEST GOOD. For nothing can gratefully affect the animus and mind except what is harmonious. Harmony, however, is not a spiritual word, but *good*; and this corresponds to harmony, in that the latter brings forth delight. In the same way, DISHARMONY and EVIL. When, in the beginning of creation, all things were said by God to be good, what was signified was that all things mutually corresponded to each other; that is to say, nature and the world corresponded to man and his mind, and the human mind to its deity. Thus there was no need of doctrine, in that there was a perfect harmony of all things, both in themselves and among themselves. 3. BEAUTY, DELIGHT (*jucunditas*), JOY (*gaudium*), HAPPINESS, HEAVEN. Beauty, and also shapeliness, is a natural word; but beauty is not noted as such, except by animated and living beings; for it flows forth from harmony and the perfect order of things. Delight is of the animus, and joy is of the human mind; and both have existence only in the animal kingdom. But happiness belongs to the soul separate from the body, and it embraces all delights in the universe; while heaven signifies the most perfect joy, and, in fact, the joy of all in each and of each in all,—a joy which, in other words, is called heavenly joy. But because this joy is inexpressible and is not comparable with our joy, it is called heaven which also signifies the heavenly society itself. 4. UNSHAPELINESS, UNDELIGHT, SADNESS, UNHAPPINESS, HELL. Since these are the opposites of the ones mentioned above, it follows that they square with each other in the same way. 5. PERVERT, HAVE AN EVIL EFFECT ON, CONDEMN. Pervert is a natural expression; have an evil effect on, is an expression that properly belongs to the animal kingdom; condemn is also a spiritual expression by reason of usage, in that the soul is condemned to torment and eternal death.* 6. DESTROY, EXTINGUISH, SPIRITUALLY KILL. Na-

**Quatenus anima supplicii et mortis æternæ damnatur.* The Latin is not clear; it would seem either that a word has been omitted (e. g., *Quatenus anima pænæ supplicii, etc.*) or that the wrong case has been used (e. g., *Quatenus anima supplicio mortis, etc.*, or *supplicio et morti æternæ*,

ture can be destroyed; the mind or life can be extinguished; but the soul cannot die, except spiritually by damnation.

32. Confirmation of the propositions. 1. That perfect order produces harmony, and harmony beauty or perfection of form; and that these restore and preserve nature; is clear from physics; it is also confirmed from the harmonies of sight and hearing, and from the other harmonies of the senses, both external and internal, in the animal kingdom,—which harmonies are ever restorative; also from love, which corresponds to harmony, in that love conjoins minds; for which reason it was that Pythagoras ascribed all things to harmonies, and that the most ancient philosophers asserted that a certain love had formed and consociated all things and now preserves them. Since these points are true, those that follow are also true, namely: That things inharmonic pervert and destroy. 2. That love of the highest good brings forth happiness, follows as a consequence, if we consider what the highest good is, namely, that it is God Himself; and that love,—and by love, the connection with such good,—cannot be separated from heavenly happiness and joy.

33. Rules. 1. There are many propositions in the class of natural things, which can have no place in the class of spiritual things. In such case others must be substituted which do have place there, and which seem to be in the nearest accordance. Thus, destruction can be predicated of nature, and extinction or death of the corporeal life; but the soul, which is a spiritual essence, cannot be destroyed, neither can it be extinguished nor die. Yet its principal essence of life, that is, its felicity, can perish, and its connection with its deity can be dissolved,—which is spiritual death and infernal torment. 2. Often we have a word expressing some natural quality, which, in the second class, can be rendered by several words; as, for instance, harmony and shapeliness, the words delight, pleasantness, gladness, joy, and innumerable others; for each sense has its own harmony and delight,—the taste having one kind,

etc,—on which latter reading our translation is based). As written in the MS, the words, literally

translated, would be, In that the soul of punishment and eternal death is condemned.

the smell another, the hearing another, the sight another, the animus another, the rational mind another. In the following pages the word modification will be met with, to which corresponds sensation, both of the sight and of the hearing, and also perception and understanding. So likewise spiritual expressions will be met with, to which there are many corresponding words in the class of things natural and animal; as, for instance, good, evil, etc.

EXAMPLE X.

34. Harmony alone conjoins the entities of nature and sustains the world; but disharmony disjoins them, and destroys the world.

Concord alone consociates minds (*animus* and N. B. *mens*) and preserves societies; but concord dissociates minds and destroys societies.

Love alone unites souls to each other, and forms the heavenly society; but hatred separates souls, whence arises infernal society.

35. Correspondences. 1. HARMONY, CONCORD, UNANIMITY, LOVE. Harmony is a purely natural word. Concord is a word belonging to the animal kingdom since it belongs to hearts (*cordes*); in like manner unanimity, since it belongs to minds (*animus*); moreover, if concord be considered as a virtue, it belongs to the rational mind. Love is, in general, a spiritual word; but, in particular, there are many loves, which signify affections, such as love of companions, of parents, of offspring, of country; conjugal and venereal love; love of honor, of riches, of the world, of heaven. 3. DISHARMONY, DISCORD, HATRED. These are recognized as correspondences, for the same reasons. 4. CONJOIN, CONSOCIATE, UNITE. Conjoin is a natural word; consociate an animal word, since it is used as between companions; to be united is to be most closely conjoined, after the manner of souls, so that it is almost like equality. [So likewise DISJOIN, DISSOCIATE, SEPARATE.]

36. *Confirmation of the propositions.* Similar to the present example is that common axiom "*Concordia res parvæ crescunt, discordia vero dilabuntur.*"* Moreover, the above considerations make it clear why love and concord are the bond of society and the union of minds (*animus*); because thus there is a comparison with harmony in nature,—which harmony corresponds to concord and love. Why harmony, concord and love are of this nature is clear from the analogies and also from geometry itself.

EXAMPLE XI.

37. There can be no harmony between natural entities without a principle of harmony in superior nature, which conjoins single things universally, and the universe singularly.

There can be no concord between human minds without a principle of concord in some N. B. superior love, which consociates single minds universally and universal society singularly.

There can be no mutual love between souls without a principle of love in God Himself which unites single souls universally and the universal heavenly society most singularly.

38. *Confirmation of the propositions.* 1. That there is a principle of harmony in superior nature; this follows from the coördination and subordination of all things in universal nature. For unless superiors ruled inferiors, the latter would never be held together in any connection, nor could they subsist; for that does not exist which is without a principle. The atmospheres are held together in their connection by purer and more perfect auras; the universal world by its sun; the animal body by the soul; and so forth. 2. Nor can there be concord between human minds without a principle of concord

*"In concord small things increase, in discord they come to nought."

in a superior or more universal love ; such as the love of honorableness, of virtue, of the country, of gain, and the like, which are wont to consociate minds,—the supreme love being love to God. Would that all possessed this love ! It would conjoin minds (*animus* and *mens*) ; and then, of a surety, heaven would be transcribed to earth, and the kingdom of God be at hand.

3. What conjoins, consociates, unites, universally, this also does the same singularly. For nothing can act universally unless at the same time it also act singularly. The universal is nothing without its singulars ; of these it is composed, and from them it becomes and is called a universal. But the quality of the universal appears from the singulars and *vice versa*.

4. From the above it now follows, that no one can love the neighbor unless he love God, and *vice versa* ; thus that these loves are joined together like links in a chain ; or, that the one depends on the other.

EXAMPLE XII.

39. It is a natural necessity that every individual substance regard each other substance as its own self, and the aggregate of like substances as many selves ; but that it regard superior substances, from which it draws its essence and nature, as above itself ; to which it is held obsequious, by reason of the pure connection and the harmony.

The first and last law of society, both earthly and heavenly, is that every individual shall love his neighbor as himself, society as many selves, and God above himself ; to whom he pays obedience, by reason of pure love.

40. *Correspondences.* NATURAL NECESSITY, LAW. All the laws impressed on nature are necessary and geometrical, not contingent and arbitrary, because dependent on no will ; for which reason they are called not laws, but necessities.

41. *Confirmation of the propositions.* That every individual substance of the world regards each other substance no more and no less than itself, is apparent from the action and reaction of the single substances, and also from their consociation; for in the degree that they are passive, in that same degree they are also active; nor do they superadd anything of their own for the sake of eminence over the neighboring substances, unless, with that force and natural perfection, that they may exalt themselves above their neighbors less than others. If we reflect on these several particulars it will become quite clear that this essential law is so impressed on nature, that without the most exact observance of it, in the part and in the whole, the mundane system could not have come into existence, nor could now subsist. For whatsoever substance strives to prevail over a neighboring substance, similar in weight, size and force, that same is expelled by the neighborhood and by the atmosphere, as destructive of the common equilibrium.

EXAMPLE XIII.

42. Everything that is harmonious is in itself shapely, while that which is inharmonious is in itself unshapely; but in the shade the unshapely frequently appears as beautiful, and *vice versa*; therefore light is needed whereby shall be revealed whether a thing is such as it appears to be.

Everything good and evil, such as the delightful and the undelightful, is naturally perceived by the senses; by reason of ignorance we are N. B. frequently deceived in our judgment concerning good and evil; therefore understanding is needed, in order that we may know whether a thing be truly good or truly evil, or whether evil be counterfeiting good.

Everything divine is in itself the highest good, while everything diabolical is in itself the deepest evil; in this corporeal understanding, which is only the shadow of understanding and a sleep, that which is the deepest evil frequently appears as though it were the highest good, or that which is diabolical as though it were divine; therefore when the Sun and radiance of wisdom shall shine forth, as in the last judgment, each one will recognize in himself what good he carries with him, and what evil; the one will not then be able to counterfeit the other.

43. *Correspondences.* I. SHADE, IGNORANCE,* OBSCURE UNDERSTANDING. In that light corresponds to intelligence, as was noted above [n. 28], so shade corresponds to ignorance, and likewise to an obscure understanding as compared with the clear understanding possessed by souls in the non-corporeal life.

44. *Confirmation of the propositions.* 1. That everything that is harmonious is in itself beautiful and shapely, and that everything good and delightful is naturally perceived by the senses, is evident from experience. What is sweet is at once perceived by the tongue, what is harmonious and symmetrical, by the ear, and what is beautiful, by the eye; so also the rational mind at once perceives what is good and evil; for of these there is a natural knowledge; from divers causes, however, this knowledge is wont to be dulled and overshadowed,—but for this we ourselves are to blame. Therefore, lest evil counterfeit good, there is granted to us an understanding, the subject whereof is truth or quality; in order, namely, that we may know the true quality of a thing, whether it be truly good, or whether it be apparent good and in itself evil; and also the

*In the MS. the order of these words is *ignorance, shade*; but this seems to be a slip.

reverse. 2. That in the last judgment each one will recognize in himself his true quality,—his deeds and deserts,—is proved to us by the Sacred Scriptures. The same is also the third term in the comparison between solar light and divine light which is wisdom; for God is called the Sun of wisdom; and just as the sun by its light discovers every quality of an object, so God by His wisdom, when He shall manifest Himself in all His glory, will in a moment discover whatsoever in each man is divine, and whatsoever is diabolical; and each one must needs actually recognize this quality in himself,—his own conscience being his judge; for, from the state of his own soul,—a state which has been formed in the body,—he will know the most minute particulars; and this the more, seeing that he is surrounded with the light of wisdom, in the presence of which nothing whatever can be concealed.

EXAMPLE XIV.

45. The sun is the fountain of all light in its world; nor is it the cause of shade; but shade is the privation of light. The sun is never deprived of light, but terrestrial objects hinder its light from penetrating; hence darkness.

God is the fountain of all intelligence in His heaven; nor is He the cause of ignorance;* but ignorance is the privation of intelligence. The N. B. soul is never deprived of intelligence, but the objects of thought, or corporeal and worldly ends, hinder its intelligence from penetrating thus far; hence ignorance of truth, or stupidity.

God is the fountain of all wisdom in His heaven; nor is He the cause of unwisdom; but

*The author at first wrote *Anima est fons omnis intelligentiæ in suo mundulo corporeo* (the soul is the fountain of all intelligence in her little corporeal

world), see n. 46; but subsequently he substituted *Deus* for *anima*, and *calo* for *mundulo corporeo*. Cf. n. 28^a.

unwisdom is the privation of wisdom. God is never deprived of wisdom, but the loves of the body and of the world hinder God's flowing in with wisdom; hence insanities.

46. *Correspondences.* 1. SHADE, IGNORANCE, UNWISDOM. Conf. above, example xiii [n. 43]. Shade also corresponds to obscure understanding. So likewise, DARKNESS, IGNORANCE OF TRUTH, STUPIDITY, INSANITY. But to proceed. That LIGHT, INTELLIGENCE, and WISDOM mutually correspond to each other, appears as a natural thing at first reflection; and therefore, to the understanding all those properties are attributed that are attributed to light; such as clearness, and perspicuity; so the spirit of truth is called the spirit of light, and the angels, angels of light. That they correspond is apparent from the human understanding which is born and perfected by means of sight and light. 2. TERRESTRIAL OBJECTS, CORPOREAL AND WORLDLY ENDS, LOVES OF THE BODY AND OF THE WORLD. Ends are always the objects of the understanding or thought, and these ends are the same as the loves; for we regard as an end that which we love. That these ends and loves hinder true intelligence and wisdom from flowing in and operating, is well known, for hence comes all human insanity.

47. *Confirmation of the propositions.* That the soul is the fountain of all intelligence, or, is intelligence itself in her microcosm, see the passage on the soul [n. 28^o]; and that she is ever in the state of her intelligence, even though the body be in a state of ignorance, as in the age of infancy, in sleep, insanity [see n. 29]; but we are here speaking of the ignorance of truth, or stupidity.

EXAMPLE XV.

48. Light reveals the quality of an object; but the quality of an object appears according to the state of light; for an object is not always such as it appears.

Intelligence discovers the truth of a thing; but the truth of a thing appears according to the N. B. state of the intelligence; for that is not always true which is thought to be true.

Wisdom manifests the goodness of a thing; but the goodness of a thing appears according to the state of the wisdom; for that is not always good which is believed to be good.

49. *Correspondences.* QUALITY OF AN OBJECT, TRUTH OF A THING, GOODNESS OF A THING. Light discovers the quality of Conf. above, example xiii [n. 43]. Shade also corresponds to an object, to wit, whether it is a stone, a tree, an animal, what is its figure or external form, and, also, where the object is transparent, what is its internal form. But intelligence discovers the quality of the thing itself, which is the same as investigating the truth of the thing; for the understanding is always engaged in the investigation of truths. Goodness, however, or good, pertains to wisdom, and this is not investigated intellectually in regard to its existence, but in regard to its quality; for it is manifested of itself, since it corresponds to harmony, as was observed above in Example XIII. 2. OBJECT, THING. Object pertains to light, thing, to the understanding. 3. APPEARS, IS THOUGHT, IS BELIEVED, [FAITH IS HAD IN]. Things appear in the light, are thought in the understanding, and are believed from intelligence.

50. *Confirmation of the propositions.* That intelligence discovers truth; the reason is, because truth is the subject of intelligence, while good is the subject of wisdom. Good is all that which we love, desire, covet, will, assume as an end; evil is that to which we are averse. But that we may know whether that is good which is believed to be good, there is given us an understanding, which searches into the truth or quality of good.

EXAMPLE XVI.

51. There are also secondary genuine lights, such as those of the sublunary world; and there

are fatuous lights; but at the presence of solar light, these latter vanish away.

There are also secondary true understandings; and there are false understandings; but at the presence of pure intelligence, such as is that of the soul, these latter are as it were nothing, or they vanish away.

There are also spiritual intelligences, such as good angels; and there are evil angelic intelligences; but at the presence of God, or of Divine Wisdom, these latter are as it were non-existent, or they vanish away.

52. Correspondences. 1. SECONDARY LIGHTS, HUMAN UNDERSTANDINGS, ANGELS. Secondary lights, are fires, candles, and the like, which make places light in the middle of the night. To these correspond human understandings, which, like the lights just mentioned, can be kindled and extinguished, and which are nothing as compared with the intelligence of the soul,—an intelligence which is pure and spiritual, and of a nature like those intelligences which angels are. 2. GENUINE and TRUE seem likewise to correspond to each other. 3. FATUOUS LIGHTS, FALSE UNDERSTANDINGS, EVIL ANGELS. Phosphoric substances give out fallacious or fatuous lights; and objects then appear clothed with an alien color and of uncertain quality. So also false understandings, whereby many things are so colored and painted over that falses appear as truths. Such also is the nature of evil angels, who, moreover, are called angels of shade and night,—angels who, though they have known truth, yet do not love it, but hold it in hatred and persecute it; and this because the truth sets up as good what to them appears to be evil, and *vice versa*.

53. Rules. 1. Because spiritual intelligences, or angels and souls, are the subjects treated of, it must be observed that such beings were created into all their intelligence; and inasmuch as they are spirits, they are also above nature, which latter is

not spiritual; and nevertheless they thoroughly understand all particulars that pertain to nature. It follows then that there is some correspondence and harmony between all things, that is, between natural things and spiritual, and *vice versa*; or, that in universal nature there is not a thing that is not a type, image and simulacrum of some one among spiritual things, all which are exemplars. Otherwise no spiritual intelligence could ever know such things as are below itself; and yet it knows them both of itself and in itself. 2. The Egyptians moreover, seem to have cultivated this doctrine, and to have signified these correspondences by hieroglyphic characters of the utmost diversity, whereby are expressed not only natural things but also and at the same time, spiritual things. Respecting this science of the Egyptians, see a complete book by Aristotle.* 3. But the reduction of singulars to their universals does not pertain to this science of correspondences, but rather to first philosophy; for spiritual things in respect to natural things are not the same as natural things in respect to spiritual things;† since if this were the case, then natural things would be spiritual,—which is contrary to right reason.

*The reference is to Aristotle's THE MORE SECRET PART OF DIVINE WISDOM ACCORDING TO THE EGYPTIANS. Since the first discovery of this book in Damascus in the beginning of the sixteenth century, its authorship has been a matter of dispute. The work was highly esteemed by Swedenborg, who in his many quotations always refers to it as a work by Aristotle. For particulars concerning this work see two articles by the present translator in the NEW PHILOSOPHY, Oct., 1912, p. 143 seq. and Jan., 1913, p. 5 seq.

†*Spiritualia ad naturalia, non se habent uti spiritualia ad naturalia* (spiritual things in respect to natural things are not the same as spiritual things in respect to natural things). There is evidently some mistake here. In the Latin edition printed by Hindmarsh the last three words are altered to read *naturalia ad spiritualia*, and this reading has been followed in all English translations, including the present. In the MS. the passage is emphasized by an "N. B." written in the margin.

EXAMPLE XVII.

54. Light without shade would not appear to be light, as neither would the perfect without the imperfect; for there would be nothing from which it could appear. So neither could the positive be given if there were not a privative; for without the privative there would be nothing from which a thing could be posited. So also without shade no visible image would be given, nor any modification, nor, moreover, any color and variety of colors. From this is apparent the use performed by shade, nay, and also by imperfection. Although shade be the privation of light, yet it exists actually; without its actual existence it would be nothing, nor would there be any knowing of what light is, and of its quality, nor of what perfection is, and of its quality.

The understanding without ignorance would not appear to be understanding, as neither would the true without the false; for there would be nothing from which it could be viewed. So neither would the affirmative be given if there were not a negative; for without the negative there would be nothing from which a thing could be affirmed. So also without ignorance and falsity no perceptible idea of the memory would be given, nor any imagination and thought, nor, moreover, any opinion and diversity of opinions. From this is apparent the use performed by ignorance, nay, and also by falsity. Although ignorance be the privation of intelligence, and falsity the privation of truth, yet it exists actually; without its actual existence it would be an *ens rationis*, nor would there be any knowing of what the understanding is, and of its quality, nor of what truth is, and of its quality.

Wisdom without unwisdom or insanity, would

not appear to be wisdom, as neither would the good without the evil; for there would be nothing from which it could be perceived. So neither would anything be given that is genuine and true, lovely and unlovely, or happy and unhappy; for without unhappiness there would be nothing from which happiness could be felt. So also, without evil, no affection would be given, no will and desiring, and no variety of desires. From this is apparent the use performed by stupidity and evil. Although stupidity be the privation of wisdom, and evil the privation of good, yet evil, that is, the devil, exists actually; without actuality evil would be an ens rationis, nor would there be any knowing of what wisdom is, and of its quality, and of what goodness is, and of its quality.

55. Correspondences. 1. THE PERFECT, THE TRUE, THE GOOD. Perfect may be taken also in the latter sense, since what in itself is true and good is also in itself perfect. So likewise the opposites, THE IMPERFECT, THE FALSE, THE EVIL. 2. THE POSITIVE, THE AFFIRMATIVE; THE LOVELY. The positive has respect to the entities of nature; the affirmative is proper to the human mind which is able to affirm and to deny. And therefore also THE PRIVATIVE, THE NEGATIVE, THE UNLOVELY. In the third class no other affirmative and negative is given than the lovely and the unlovely; for everything good or delightful is perceived naturally, and therefore the affirmative is perceived of itself when the thing is lovely, and the negative when it is unlovely. 3. VISIBLE IMAGE, PERCEPTIBLE IDEA. That an image is an idea in the internal sense* is well known; also that the images of sight pass over into ideas,—first material and then intellectual. 4. MODIFICATION, SENSATION,

*Sense here is used to signify the internal sensory organ. When an image of sight passes by the optic nerve to the internal sen-

sory, it is there perceived as an idea. See *The Soul*, 85-86, 93, 95, 97, 98, where the matter is fully discussed.

IMAGINATION, THOUGHT, AFFECTION. What in the atmospheric world is called modification, that same in the animal kingdom is called sensation, imagination, thought; for as soon as modification touches the sensory organs, or organs of the animated body, it becomes living,—which is the reason why sensation is said to be effectel by modification. Affection also corresponds, because the mind and animus is affected according to sensation. 5. COLOR, OPINION, WILL. Color is a variegated and diversely modified light, consequently it corresponds to opinion; and thus variety of colors to diversity of opinions. 6. NOTHING, ENS RATIONIS. Both terms signify the same thing.

56. *Confirmation of the propositions.* 1. That there would be no light without shade. Suppose mere and pure light, and no greater or less degree thereof, or its decrease even to shade; in such case it could never be affirmed in respect to light, that there would be any; neither would images exist, which are variegations of shade and light, nor colors; in a word, there would be no visible world. For, as the science of optics teaches, individual objects are distinguished solely by degrees of light; that colors also arise therefrom, has been demonstrated elsewhere.* Thus it is apparent that no perfection can be conceived of without imperfection; and so no truth without falsity. These considerations confirm the real existence of evil or the devil, to the end, not only that the idea of good may be exalted, but also that it may actually exist in the created world. 2. Without ignorance and falsity, the affirmative and the negative can have no existence in the human understanding; for if there were nothing but truth, and if moreover nothing were unknown, then certainly there would be nothing that would not be affirmed; indeed, there would be no need of affirmation; consequently there would be no thought, still less any opinion, and thus no speech, discourse, exchange of human society. 3. A like reasoning applies to the good and the evil, the delightful and undelightful, the happy and the unhappy; the one cannot be posited when the other is lacking, for there

*The reference is probably to *dom*, vol. I, n. 86; see also *The Economy of the Animal King-Soul*, n. 76.

would be no relative. From this it follows that evil, that is, the devil, actually exists, and I venture to say that without the devil there would be no variety in the affections of the animus and mind, thus no cupidities, desires, wills, and consequently no mind such as the human mind. 4. Granting evil, falsity also is granted; just as, granting good, truth is granted. For if one hates good and loves the contrary, or evil, he then hates truth and loves falsity; for whatsoever is loved, that same is believed to be good; moreover, he hates truths and loves falsities, because the latter are soothing to his affections.

EXAMPLE XVIII.

57. Mere snowy whiteness, without the other colorings that arise from the mixture of white with black,—and also one single permanent modification,—deprives the eye of all its faculty of sight; for the eye is formed for the reception of many images and objects; since it is mere differences harmonically conjoined that produce sensations, and renew them.

Mere intelligence in truth, without conjectures and opinions that draw their origin from the mixture of truth and falsity, and from ignorance,—and also constant thought or rational intuition on one single subject,—bereaves the mind of all its faculty of thought; for the mind is formed for the reception of many ideas, and for the intuition of many ends; since it is mere variations agreeably united that produce human thought and understanding, and renew them.

58. Correspondences. 1. WHITENESS, INTELLIGENCE IN TRUTH, TRUTH. In like manner as light corresponds to intelligence, so whiteness, and also PELLUCIDITY OR TRANSPARENCY, seems to correspond to what is true or the truth; for truth is the subject of intelligence. So with BLACKNESS and FALSITY. [1a. COLORINGS, CONJECTURES, OPINIONS.] 2. EYE, RATIONAL

MIND, or, rather, internal sensory organ; for the understanding is called the internal sight, or the rational intuition of the thing set before it.

59. *Confirmation of the propositions.* It is well recognized that the eye is dulled and blinded by sheer whiteness, as, for instance, by snow, if no darker color be present whereby the sight shall be varied; so that sight would be entirely destroyed if light alone should strike the eye without shade. The like would be the case with our understanding if pure truths should enlighten it.

EXAMPLE XIX.

60. Whiteness proportionately mingled with blackness, by means of the rays of solar light, excites divers colors, to wit, more or less bright and dark; but objects may be so besmeared and painted, as to render it unknown what is the white and what the black, and how they are commingled.

Truth rationally mingled with falsity, by means of intelligence, produces diverse reasonings, to wit, true and doubtful; but intentions may be speciously adorned, so that we know not what is the true and what the false, and how they mutually cohere.*

61. *Correspondences.* I. PROPORTIONALLY, RATIONALLY, or analogically and analytically; it is on this account also that

*In the original manuscript there here follows a third paragraph which is crossed off by the author, but is included in the Latin and English editions of the *Hieroglyphic Key*. It may be noted that the author has not crossed off his references to this paragraph in n. 60. Translated, the crossed-off passage reads: Good commingled with evil, or

the auspicious (*faustum*) with the inauspicious (*infaustum*), produces in the animus and mind diverse affections, to wit, grateful and ungrateful; but desires and cupidities can be skillfully dissembled, so that we know not what is the good or auspicious, and what the evil or inauspicious, and how they are mutually conjoined.

every proportion is said to consist of ratios. 2. BRIGHT COLORS, SENTIMENTS, GRATEFUL AFFECTIONS. For if colors correspond to opinions it follows that bright colors correspond to sentiments, that is, to truer opinions;† and DARKER COLORS to HYPOTHESES, CONJECTURES, UNGRATEFUL AFFECTIONS. To be BESMEARED, PAINTED, SPECIOUSLY ADORNED, or, to counterfeit the appearance of truth, to dissemble.

EXAMPLE XX.

62. Things clear and serene are for the most part interpollated by things obscure and misty; thus, in inferior nature, there is rarely any pure clearness without obscurity.

Things evident and manifest are for the most part interpollated by things ambiguous and doubtful; thus, in our rational mind, there is rarely any pure evidence without ambiguities.

Things pleasant and sweet are for the most part interpollated by things unpleasant, ambiguous and bitter; thus, in civil life, there is rarely any pleasantness without unpleasantness.

63. Correspondences. 1. CLEAR, EVIDENT, PLEASANT. Things clear have to do with light, things evident, with the understanding of what is true, and things pleasant, with the mind and animus in relation to good. Thus things evident signify things that are true, and things pleasant, things that are good. So likewise SERENE, MANIFEST, SWEET. 2. OBSCURE, AMBIGUOUS, UNPLEASANT. It is on this account that obscurity is also attributed to the understanding when the latter stays in doubt. It must be observed that things pleasant, sweet, unpleasant, bitter, do not indeed seem to correspond to things serene, manifest, obscure, misty; but here singulars are

†The Latin word *opinio*, like its English equivalent *opinion*, signifies a belief or conjecture whether well founded or not. But *sententia* (sentiment) signifies an

opinion adopted after due consideration; the word is therefore used to express the opinion or sentence of law courts.

assumed for universals. The universals in the present case are Good and Evil. Everything pleasant, delightful, sweet, is good, and everything unpleasant and bitter is evil; and inasmuch as the matter here concerns the affections of the animus, adequate formulas must be used.

64. Rules. Singulars must be substituted in place of universals when singulars are the subject treated of; and so particulars for generals; as, in the present example, sweet, pleasant, bitter, unpleasant, for GOOD and EVIL.

EXAMPLE XXI.

65. In the night-time is dense darkness; in the morning comes the dawn; the light then increases even to noon; but from noon it decreases and, through the shade of twilight, returns again to its night. And yet the sun illumines its world equally at midnight as at noonday.

In the first age in the maternal womb is mere ignorance, but in the age of childhood the understanding begins to shine forth; and it afterwards grows even to adult age; but from this age it decreases, and, through senile age, sinks again into obscure understanding and into ignorance. But the soul's intelligence rules its animal microcosm, both in the age of most obscure understanding and in the age of complete and ripened judgment.

66. Correspondences. 1. NIGHT-TIME, OBSCURE AGE IN THE WOMB, then MORNING-TIME and AGE OF CHILDHOOD or the rising sun;* then TIME OF NOONDAY and ADULT AGE; afterwards TIME OF TWILIGHT and DECLINING or SENILE AGE. That these correspond to each other is apparent of itself, for they are used allegorically in all speech. 2. Also, INCREASES and GROWS. 3. DAWN, THE UNDERSTANDING FIRST SHINING FORTH. 4. SHADE OF TWILIGHT, OBSCURE UNDERSTANDING. 5. NOONDAY,

**Oriens,—the rising, rising sun, east.*

COMPLETE UNDERSTANDING OR MATURE JUDGMENT, such as obtains in adult age.

67. *Rules.* Exemplars are in the spiritual world ; images and types are in the animal kingdom ; but simulacra in nature. 2. There are many species of representations or correspondences. The FIRST species is to be called *Harmonic correspondence*, such as exists between light, intelligence, wisdom ; between conatus and will ; between modification, sensation, imagination, thought, etc. There is a like correspondence between images of the sight, and ideas, and finally reasons,—which three mutually correspond to each other as though they were terms in a successive analogy.* The SECOND species is *Allegorical correspondence*, and is formed by similitudes. It is in this way that we are wont to express spiritual things naturally, for all spiritual words are occult qualities. In the Scriptures this species of correspondence occurs quite frequently. The THIRD species is *Typical correspondence*, and is formed by so many likenesses, as in the Jewish church, wherein is represented Christ and the Christian Church, and wherein, in the latter church, is represented the kingdom of God and the heavenly society. The FOURTH species is the *Fabulous correspondence*, in use among the ancients, who clothed the deeds of their heroes with fabulous fictions. Of this nature also are the representations of the poets, and those of dreams. 3. It is right to believe that the universal world is wholly filled with types but that we know very few of them ; for the present time always involves the future, and there exists a connection and chain of contingencies, inasmuch as there is a most constant trend and flow of Divine Providence. 4. That it is allowable to thus interpret Sacred Scripture ; for the Spirit speaks naturally, and also spiritually.

*As, for instance, 2, 4, 16 ; 3, 9, 81, etc.

[THE END.]

THE RED BLOOD.

BY EMANUEL SWEDENBORG. (*Continued.*)

CHAPTER X.

THAT IN THE LIVING BODY, THE RED BLOOD IS BEING PERPETUALLY DISSOLVED, PURIFIED, RENOVATED.

It has been proved that the globules of the red blood are dissolved into lesser and pellucid globules. That they are also recomposed or renovated, follows as a consequence, since the same quantity still remains in the veins and arteries. This resolution and recomposition of the blood produces that circulation which I term the circle of life; that is to say, the circulation which is carried on from vessels to fibres and from fibres to vessels. Thus by resolution nothing of the blood is lost; but at each resolution it merely returns to its first essence and nature, and from this again reverts to its general, that is, to its ultimate form. When the structure is dissolved, that is, when the red blood dies, it does not perish, but returns each time to its purer life or soul, as to its parent. Thus death and life alternate in us at every moment, and each part of the blood represents the general state of the body. Without the continual dissolution and renovation of the blood the uses of the foods would also be vain; for fresh elements wherewith the blood may be compounded anew, must be constantly summoned, when the obsolete and antiquated are exterminated; and therefore also the blood is always surrounded with abundant serum which is stored with these elements and proffers them. Add to this, that the blood must be continually purified in order that it may serve all the uses of animal nature; that is to say, may give birth to the many humors with which the viscera abound. Moreover, the blood must by all means be dissolved and renewed in order that it may be purified and may exist in a condition ever proper and suitable; for when too hard and compact it puts forth or unlocks nothing whatever of the treasure stored up in its bosom. Thus the lot and condition of the corporeal life consists in the softness of the

blood and its divisibility, but not in its hardness. What is vital is also soft, patient and yielding; it is the opposite if hard, sluggish and inert.

CHAPTER XI.

THAT THE GLOBULE OF RED BLOOD CONTAINS WITHIN IT PURER BLOOD AND ANIMAL SPIRIT, AND THIS THE PUREST ESSENCE OF THE BODY, THAT IS TO SAY, THE SOUL (*anima*) SO THAT THE RED BLOOD IS A SPIRITUOUS AND ANIMATED HUMOR.

The blood is the repository of all the prior or purer humors of the body, and the seminary of all the posterior or grosser; so that it contains the prior in actuality and the posterior in potency. The animal spirit descends from the very essence and substance of the soul; the purer or middle blood from the animal spirit; and the red blood from the purer blood. It is only by a succession and derivation of this kind, that the soul can be present in the several parts; for in order to its being present it must be within the single parts in the above order. Therefore the inmost thing that is laid up in the red blood is the very essence of the soul which, since it rules and determines its blood, rules also and determines the several parts that depend on the blood. Unless the blood contained within it prior animal essences, things prior could never provide for things posterior, nor could things posterior refer themselves to things prior; consequently there would be no mutual respect, dependence, harmony and real correspondence. Therefore the blood is spirituous and animated.

CHAPTER XII.

THAT THE RED BLOOD PARTAKES ALMOST EQUALLY OF THE SOUL AND OF THE BODY; AND THAT IT MAY BE CALLED BOTH SPIRITUAL AND MATERIAL.

The blood partakes of the soul in that it stores within itself the purer blood; this the animal spirit; and this again the first essence or soul. It partakes of the body in that, at the

same time, it contains terrestrial, inert, and saline parts whence arise its gravity, color, harder consistency, and many other properties which are qualities belonging to the body and which attach to things material; to say nothing of the fact that the blood globules are of a circular form and thus also corporeal. How much space in the blood globule is occupied by the one, and how much by the other, is also a matter that can be submitted to calculation, provided that the inmost space which is filled with the little saline cube, and the angular interstices which are filled with the smaller trigons, be compared with the space occupied by the globules; although, in these globules also are purest elements of a similar but purer nature, which likewise strengthen their structure, temper their activity, and fix their volatility.

CHAPTER XIII.

THAT THE RED BLOOD MAY BE CALLED THE CORPOREAL SOUL.

Regarded in itself the blood is not the soul, but the soul is within it; which soul can thus and in no other way rule and determine forms that are ultimate and remote from itself. Nature ever acts in her own modes and measures. In order that she may act upon ultimates she must act by means of intermediates with which also she may be present and within. Thus because the blood is the soul's vicegerent in the ultimates of its kingdom, it may be called the corporeal soul and a succenturiate force; especially in those who allow themselves to be ruled by the body and not by the spirit; such as brute animals, and also their likenesses in human society; for in these the blood and body hold sway over the soul, and not the soul over the body.

CHAPTER XIV.

THAT IN THE RED BLOOD IS A COMMON AND OBSCURE LIFE.

The one vital essence, or that within which is life, is the soul; all else derives its possession of life from the soul. So also the blood, wherein inmost abides the soul and conse-

quently life. But the blood is the common abode of the soul, nor is this blood distinctly determined by means of any fibres; therefore it is an obscure life, that is to say, a life without sensation or any intellectual faculty. It is essential determination or form that produces the effect of our living distinctly in such and such way and no otherwise. Thus from the form can be judged the quality of the life, and consequently the quality of the blood's life, which comes out somewhat more distinctly by means of the determination of its arteries and veins; but still is not such as to be called sensible.

CHAPTER XV.

THAT FROM THE RED BLOOD CAN BE JUDGED THE NATURE OF THE PURER BLOOD; FROM THE PURER BLOOD THE NATURE OF THE ANIMAL SPIRIT; AND FROM THIS THE NATURE OF THE SOUL; WITH THE HELP HOWEVER OF THE DOCTRINE OF FORMS, OF ORDER AND OF DEGREES.

From things visible and ultimate judgment can be made concerning things invisible and prior, or from compounds concerning simples; for within compounds there can be nothing truly essential except the first essence. The nature of the red blood stands out before the very sight, but not so that of the purer blood, and still less that of the animal spirit; from the former, however, can be inferred the nature of the prior essences. This method of exploring the unseen and occult things of nature is called the analytical method; but it needs the experience of the senses, and also the sciences as guides, which shall lay down the laws and the order whereby nature proceeds, or whereby must proceed our exploration. If there are salino-urinous elements within the red blood, the order seems to be such that there must be similar, but more pure, simple, and perfect elements within the white blood,—elements which can never be detected even by the most acute sight; and that within the animal spirit there must also be like elements but most highly simple and perfect. Otherwise there would be no derivation, nor any distinction of the one essence from

the other. But the degrees of the perfection of such entities cannot be explored except by the doctrine of forms. Meanwhile it is plainly apparent from the above considerations how greatly the experience of the senses contributes to disclosing the arcana of nature; and that without such experience we can never ascend to the knowledge of things superior and more simple.

CHAPTER XVI.

THAT THERE IS A GROSSER, A PURER AND A PUREST BLOOD.

The red blood is properly called the blood; but the purer not so properly, because it is not red but white; while the purest is the animal spirit. Over each of them is the soul, which is not a blood but is the first, inmost, supreme, most simple and most perfect essence of the bloods, and the life of all. The red blood draws its principal essence from the minuter globules which are within it; and therefore a stream of such globules cannot but be called a blood. A similar reasoning holds good of the animal spirits which are within the purer blood. Thus they are all called bloods, and are so called in the Scriptures. The substantial and essential remains ever the same, and it is mere accidents that vary the notion. For if blood is not so named from its redness, gravity and grossness, but from its interior nature, then the one and the other are both bloods; unlike what would be the case if it were named from the above mentioned accidents. These bloods, regarded in themselves, are indeed most utterly distinct; for although they are simultaneously present within the red humor, yet they observe an actual distinction from each other. Consequently, for the sake of distinction, they must be signified by different names; and if not always by different names, at any rate by a predication indicating perfection; by the predication, namely, that the animal spirit is the first, supreme, inmost, simplest, purest, most perfect blood; that the white blood, compared to the red, is prior, superior, interior, more simple, pure, and perfect, or is a middle blood; and that the red blood is the last, lowest, outmost, compound, grosser, more

imperfect, ultimate blood which is the blood proper. The same also applies to their vessels; for simple fibres, compound fibres, and blood vessels mutually follow and correspond to each other in the same manner and order.

CHAPTER XVII.

THAT THE FABRIC OR FORM OF THE PRIOR OR PURER BLOOD IS MORE PERFECT THAN THE FABRIC AND FORM OF THE POSTERIOR OR GROSSER BLOOD.

The form of the globule of the red blood is circular; for the globule is perfectly spherical and, in its vessels, it has a circular revolution; in addition, it includes parts that are of an angular form. Thus the form of the globules of the red blood is the ultimate and penultimate of forms. But the form of the globule of the purer blood is not circular or spherical but spiral, as can also be inferred from the fact that these globules are oval, being on this account called plano-oval;* for the spiral form of the fluxion of the parts carries this figure or external form with it; as is also the case with the cortical glands which are also spiral forms and at the same time vortical. But the form of the globules of the purest blood, is the next superior form, namely, the vortical; for as the bloods themselves become simpler so also do the forms become more perfect. That such is the order, and such the ascent, of perfections, is the lesson of the doctrine of forms and also of experience.

CHAPTER XVIII.

THAT THE THREE BLOODS RULE IN THE ANIMAL BODY BOTH CONJOINTLY AND SEPARATELY.

They rule conjointly in the red blood, for herein are both the purer blood and also the animal spirit; wherefore the red blood is called the repository of the preceding fluids. They

*See 1 *Ec. of An. Kingdom*, n. 32².

rule conjointly also in the purer blood within which is the above mentioned spirit, and within this the soul. Each blood also rules separately; that is to say, the animal spirit in its fibres. the purer blood in its, and the red blood in the vessels. Thus in the organic body the several parts are separated and at the same time united; and the blood actuates its own cause and rules its own organism, and so likewise the other. Thus only and in no other way can the soul ordinally and successively form and rule its body, and preside over it and hold sway most singularly and at the same time most universally. For the more conjoined these ruling humors are in the red blood, and the more exquisitely distinguished each from the other, the more perfect is the organism and the more obediently do the several parts bow to the decision of the soul. But as soon as these discriminations and unitions are confounded, the sensation and action of the body becomes more or less indistinct, undetermined, insensible and imperfect. From this same cause it is that at every turn of the circulation the red blood is resolved into purer blood, and this into its spirit; and that from these again is compounded the red blood; thus the circle of life is carried on.

CHAPTER XIX.

THAT THE ANIMAL SPIRIT ACTS INTO THE BLOOD, AND THE
BLOOD INTO THE SPIRIT BY MEANS OF VESSELS AND FIBRES;
WHENCE COMES THE ALTERNATE AND RECIPROCAL
ACTION OF THE MUSCLES.

But this is merely for mention; the action of the muscles will be treated of in the following chapter. Without the discrimination of the agent humors there can be no reciprocal action, that is, no simultaneous and successive action and reaction.

CHAPTER XX.

THAT THE STATE OF THE RED BLOOD DEPENDS ON THE STATE
OF THE PURER BLOOD, AND THE STATE OF THE LATTER
ON THE STATE OF THE SPIRITS.

The quality of a compound is according to the quality of that which is within it substantially; for, granting the ex-

istence of accidents, a compound draws its nature from the nature of the simples existing within it. The red blood may indeed be defiled with heterogeneous matters; but since at each turn of the circulation it is for the most part resolved and recomposed, and the harder, or antiquated and indissoluble parts, rejected towards the liver and its gall bladder, so it is successively purified. Therefore so long as the animal spirit and the purer blood remains consistent in its integrity a morbid state of the red blood or body may be restored; this is said to be done by the work of nature. In this way does the one inflow into the other, and the prior or interior repair what has failed in the posteriors or exteriors.

CHAPTER XXI.

THAT INFINITE CHANGES OF STATE HAPPEN BOTH TO THE RED BLOOD AND TO THE PURER.

That the animal spirit undergoes infinite changes of state has been shown in the Transaction on the Spirits. All this change and nature of the spirit passes over and is derived into the state and nature of the purer blood, and all the change and nature of the latter into the state and nature of the red blood; for the state of the one depends by continual influx on the state of the other. Moreover, many changes and varieties, to wit, in respect to accidents and accessories, are induced on the purer blood, which are proper thereto, and all and each of which change the state of the red blood. There are also changes of state proper to the red blood, namely, in respect to accidents and accessories. Accidents are the situation and connection of the ingredient and constituent parts, and consequently their order, whence is their form and quality. Accessories are those salino-urinous and sulphureous parts which are acquired for the sake of copulation; on these accessories and their quality and quantity depends for the most part the change of accidents or of the situation and connection of the genuine parts and essences. Hence we have blood that is more or less soft, hard, hot, cold, ruddy, pale or green; in a word, the circumstance that the blood is spurious, legitimate, or varied. From

all this it is apparent how in compounds mutabilities increase, and consequently inconstancies and imperfections; for each change of the state of the simple parts that are within induces a change on the compound, but not *vice versa*; for in every compound there are accidents that are proper thereto and also accessories. That the changes of the state of the blood are infinite in number, that is, exceed all number, can be demonstrated analytically and by calculation.

CHAPTER XXII.

THAT THE BLOOD OF ONE INDIVIDUAL IS NEVER ABSOLUTELY SIMILAR TO THE BLOOD OF ANOTHER.

That no one's soul and no one's animal spirit is absolutely similar and equal as to every nature and all accidents to the soul and spirit of another, has been pointed out above. From this it follows that the blood of one individual can never be absolutely similar to that of another; for as the animal spirit is, such is the purer blood, and as the purer blood is, such is the grosser or red blood. This latter can also be varied in infinite other ways. For the blood of one individual is harder or softer than that of another, it is also heavier or lighter, hotter or colder; also paler, redder, blacker. Moreover the globules differ in size. Instead of a little saline cube or octohedron in place of fulcrum, there may be a dodecahedron, hexahedron, or pentahedron, whence there would be a smaller or greater quantity of the purer globules, and thus a variation of the form. Instead of urinous salts or subtle and volatile trigons inserted in the angular interstices, there may be acids or more fixed salts, or elements of another class, which to that extent would vary the state of the blood globule. The globule may be engirdled with other ramenta and fragments of the utmost diversity, and may, at the same time, be surrounded by an equally diverse chyle and serum; besides many other varieties the recountal of which would be too prolix. That there are so many diversities of bloods is confirmed from the common rule, to wit, that according to the number of the heads and subjects so many are the diverse bodies, actions, animuses, minds, inclina-

tions and temperaments; so that I am induced to believe not only that the blood of one individual is never absolutely similar to that of another, but that neither in the same subject is it altogether of the same quality at one moment as at another (for the mind and animus which depends on the state of the animal spirits perpetually varies); and further that one globule of blood is never absolutely similar to another globule. I say nothing of the blood of land animals, birds and fishes, whose globules are differently formed, some of them being of an oval figure covered with a thin surface or crust, white, cold by nature, etc., etc.

CHAPTER XXIII.

THAT THE RED BLOOD IS THE SEMINARY OF ALL THE HUMORS OF ITS BODY.

These humors are "chyle, milk, . . . lymphs, . . . saliva, bile; the liquor of the pancreas, stomach, intestines, œsophagus, brain, eyes, thorax, pericardium, abdomen, tunica vaginalis testis; the genitura or seed with the liquor of the prostates; the mucus of the nostrils, tonsils, joints, urethra, uterus, vagina and tubes of the uterus; the humor of the ovules, and that in which floats the fœtus; the wax of the ears, urine, sweat," and many other humors which must be specifically discriminated.* That the red blood furnishes the natal origin to most of the above mentioned humors is clear from the very fabric of the glands wherein such humors are prepared and elaborated for every use. For the glands are made up of nothing but vessels and fibres; into them enters the red blood and the purer with its vessels, and also the spirit with its fibres, and from them a reformed humor afterwards issues forth; as is visible in the milk, genitura and saliva. For in each of its little spheres the blood comprehends mere principles and elements; consequently, in potency and virtue,

*The passage which the translator has placed between quotation marks, is taken from Heister, *Compendium Anatomicum*, n. 34.

Heister enumerates also "blood, serum" and "animal spirit," but these are naturally omitted by our author in this connection.

it possesses everything in the world that is ever producible from principles, elements and simple substances; that is to say, everything that is possible. A globule which holds within itself elements and determined unities, and this so subordinated and coördinated that it can be resolved into these several parts cannot but procreate all the species of humors in the universe; as also it does in actuality, since it is resolved at each turn of the circulation. Consequently, in the nature of things no compound entity can exist more perfect than the blood. From this embodiment of the blood as now delivered, it follows as a consequence, that each of its globules is as it were a microcosm, or, that it contains, in actuality, **all the things that have** preceded, and in potency all the things that follow,—and thus, in potency, a kind of universal human race, for from it springs the genitura.

THE FOURTEENTH ANNUAL MEETING

OF THE

SWEDENBORG SCIENTIFIC ASSOCIATION.

The Fourteenth Annual Meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION will be held in the Sunday School Room of the First New Jerusalem Society, at 22d and Chestnut Streets, Philadelphia, on Wednesday, May 23d, 1917.

PROGRAM.

Afternoon Session, at 2:30 P. M.

Papers: Swedenborg's Travels, Alfred H. Stroh.

Models of Swedenborg's Finites, Prof. C. R. Pendleton.

Evening Session, at 7:30 P. M.

Annual Address: Swedenborg's Psychology, President L. F. Hite.

Members and friends of the ASSOCIATION are all cordially invited to attend.

REGINALD W. BROWN,
Secretary.

THE NEW PHILOSOPHY.

Vol. XX

JULY, 1917

No. 3

TRANSACTIONS

OF THE

TWENTIETH ANNUAL MEETING

OF THE

SWEDENBORG SCIENTIFIC ASSOCIATION.

The Twentieth Annual Meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION was held in the Sunday School Rooms of the First New Jerusalem Society, in the City of Philadelphia, on Wednesday, May 23rd, 1917. President Lewis F. Hite occupied the Chair.

AFTERNOON SESSION : 2:30 P. M.

1. On motion the **Minutes** of the Nineteenth Annual Meeting were adopted as printed in the NEW PHILOSOPHY for July, 1916, and the reading of them was dispensed with.

2. The Chair appointed Mr. Francis L. Frost a **Committee on the Roll**. The Committee later reported an attendance at the meetings of thirty members and fifty-six visitors.

3. The **Membership** of the Association and the **Subscriptions** to the NEW PHILOSOPHY were reported as follows:

MEMBERSHIP:

Net Membership, May, 1916	210	
New Members since May, 1916	10	
		— 220
Resigned	10	
Died	6	
Address unknown	3	
Lapsed	8	
		— 27
		—
Net Membership, May, 1917		193

NEW PHILOSOPHY:

Subscribers who are Members	187
Subscribers not Members	23
Total number of Subscribers	210
Exchanges	14
Free copies (mostly to Libraries)	68

4. The **Board of Directors** reported that it had held two regular meetings since the last annual meeting, the first on May 25, 1916, the second on May 14, 1917; and that in addition the members had held a number of less formal meetings.

On May 25, 1916, the following officers were appointed: Vice-President, Dr. F. A. Boericke; Secretary, Reginald W. Brown; Treasurer, Prof. C. E. Doering; Editor of *NEW PHILOSOPHY*, Prof. Alfred Acton.

It was reported that President Hite had consulted with all the Directors in regard to the proposal to print 300 copies of Bishop W. F. Pendleton's paper on Swedenborg's Doctrine of Creation, to be held for inclusion in the proposed Primer of Swedenborg's Philosophy, and that it was finally concluded that it did not seem advisable to hold the paper for the Primer as it was doubtful whether the Primer should be of the character of the paper, which had not been prepared with any plan of the Primer in mind.

It was further reported that the Board had agreed to appoint a Committee to audit the Treasurer's accounts before the Annual Meeting, and that the Chair had appointed Dr. F. A. Boericke and Mr. E. C. Bostock as such a Committee.

That it was agreed to authorize the reprinting of 50 copies of the Address to be delivered by the President at the Annual Meeting.

That a special report to the Board of Directors had been received from Mr. Alfred H. Stroh (see page 74), and that the Board had agreed to request Mr. Stroh to read this report before the Annual Meeting.

That the Board had expressed its hearty approval of the proposition that the Association undertake to interest the General Convention and the Academy of the New Church in mak-

ing it possible for Mr. Stroh to continue his editorial work in Sweden. On motion the Board resolved to memorialize the GENERAL CONVENTION and the ACADEMY OF THE NEW CHURCH to the effect that since the work of phototyping has been temporarily suspended, and since the valuable work of Mr. Stroh in Sweden ought to be continued and supported, the Swedenborg Scientific Association petition the GENERAL CONVENTION and the ACADEMY OF THE NEW CHURCH to each contribute the sum of \$900.00 toward Mr. Stroh's support for one year, for the purpose of his continuing the editing of the Royal Swedish Academy edition of Swedenborg's Philosophical and Scientific Works; the Swedenborg Scientific Association on its part offering to keep in touch with the progress of the work and to transact such business as the success of the undertaking and the interests of the contributing bodies demands.

In connection with the foregoing resolution it was pointed out that the amount asked for was the same as that which had been paid annually to Mr. Stroh as a salary in the past, but that it should be borne in mind not only that the price of living has increased in recent years, but that the rate of Swedish exchange has also considerably advanced. In view of these facts it was suggested that the ROTCH TRUSTEES might be asked if they would be willing to contribute the sum of \$200.00 in order to help place Mr. Stroh's salary on approximately the same basis as formerly.

(A copy of the Memorial presented to the GENERAL CONVENTION and to the ACADEMY OF THE NEW CHURCH will be found on pages 78-83 of this issue.)

5. On motion it was agreed that the report of the Board of Directors be accepted and filed.

6. The **Treasurer's Report** was presented as published on page 70. It was reported also that the report had been duly audited and found to be correct.

7. On motion it was resolved that the report of the Treasurer together with that of the Auditing Committee be accepted and filed.

8. The **Editor of the New Philosophy** presented his Report as published on page 71. On motion it was agreed that the Report be accepted and filed.

9. At this point in the Meeting the Treasurer announced that he had received a contribution of \$100.00 toward the uses of the Association since the opening of the session. The Announcement was greeted with applause, which was especially appreciative since the reports had made it very manifest that additional funds were needed to carry out successfully the uses which the Association has undertaken.

10. It was urged by Prof. Iungerich and others that the Directors keep the needs of the Association before its members. On motion of Mr. Stroh it was voted that the matter of a suitable statement designed to acquaint the general public with the needs of the Association in the progress of its work be considered by the Board of Directors for publication in the periodicals of the Church.

11. A lively interest was manifested in the work that had been done by the Association, and various speakers suggested means by which this interest might be extended and the support of the work increased.

12. At the suggestion of the Chair it was agreed to appoint a **Nominating Committee** to report as early as convenient. The Chair appointed Messrs. E. E. Iungerich, J. B. Spiers and L. E. Gyllenhaal.

13. Mr. Alfred H. Stroh addressed the meeting on the subject of "Swedenborg's Book of Travels," presenting a history of the work together with an analysis of its content and importance.

14. Professor C. R. Pendleton addressed the meeting on "Models of Swedenborg's Finites." Professor Pendleton's remarks which were illustrated by a series of models illustrating various interpretations of Swedenborg's conception of the vortical form and motion of the "finites" of his *PRINCIPIA* was greatly appreciated and led to an interesting discussion of the subject.

15. The **Nominating Committee** reported the following nominees: For *President*, Professor Lewis F. Hite, and for *Directors*, Dr. F. A. Boericke, Professors Reginald W. Brown, C. E. Doering, and Alfred Acton, and Messrs. B. A. Whittemore and Horace P. Chandler.

TREASURER'S REPORT.

RECEIPTS.

Dues	\$191.00	
Subscriptions	116.20	
Contributions	4.00	
Sale of Publications	24.26	
		\$335.46
Balance, 5-24-16		132.10
		\$467.56

EXPENDITURES.

Printing four issues NEW PHIL- OSOPHY, Jan., April, July, Oct, 1916	\$203.25	
Paper for NEW PHILOSOPHY, three years, July, 1914-April, 1917	58.97	
Printing Index to Senses	61.00	
Sundries: Stationery, addressing en- velopes, freight, cartage, postage	31.95	
		\$355.17
Balance, 5-22-17		112.39
		\$467.56
Includes Royal Academy Pub.	10.00	
Plate	2.00	
		\$12.00
Dues unpaid, 1917	\$49.00	
Subscriptions unpaid, 1917	32.00	
Dues unpaid, 1916-'17	21.00	
Subscriptions unpaid, 1916-'17	12.00	
Dues unpaid, 1915-'16-'17	11.00	
Subscriptions unpaid, 1915-'16-'17	6.00	
		\$131.00

C. E. DOERING, *Treasurer.*

Audited and found correct, May 22, 1917.

FELIX A. BOERICKE,

EDW. C. BOSTOCK,

Auditors.

REPORT

OF THE

EDITOR OF NEW PHILOSOPHY.

Since my last Report, four issues of the *NEW PHILOSOPHY* have been published,—the January and April numbers being combined in one issue. The total number of pages comprised in these issues is 152, as follows:

Transactions, including Addresses at Annual Meeting..	27
Editorials and articles	61
Translations	64
	152

According to a Resolution of the Board of Directors, the policy of the paper has been to print 32 pages in each issue, and to print the Transactions as so many extra pages. Taking the seven years, January, 1911, to October, 1916, this allowance has been exceeded by 46 pages. This very moderate excess, averaging a little over $1\frac{1}{2}$ pages an issue has been due to sundry causes, but most especially to the Editor's hope that the finances of the Association would permit a gradual increase in the size of our official organ. It is now evident, however, that, unless there is some increase in our resources, not only must we limit future issues to 32 pages, but we must also include the Transactions in these pages instead of printing them as extra pages, as heretofore.

At the time of our last Report Miss Beekman's *PHYSIOLOGICAL PAPERS* were all printed with the exception of an Appendix consisting of a Chart with explanatory comment. This Chart has now appeared in the *New Philosophy*. The whole work has been held in type, and final corrections are now in the printer's hands. Title-page, preface, and Table of Contents

have been prepared, and there remains only the making of a General Index. When these are printed the book will be ready for publication under the title, *THE KINGDOM OF THE DIVINE PROCEEDING*.

The whole translation of the *FIBRE* has been reprinted from the *New Philosophy* in an edition of 1,500, but before this work can be published there must be added, Title-page and Preface, Anatomical quotations to fill the first 57 paragraphs which are missing in the original MS., but whose contents can be gathered with some accuracy from references in the work itself, and finally an Index. The Index is already made and is ready for the printer; the main work on the 57 missing paragraphs has been done, though much still remains to be done, The writing of a bibliographical Preface is a comparatively simple matter. If the editor's duties in connection with the other work of the Association permit, he hopes to complete this editorial work on the *FIBRE* during the summer months, in which case the work should be published before the close of the year. But the extra printing involved will cost about \$150.

Swedenborg's *HIEROGLYPHIC KEY*, containing his doctrine of correspondences, has appeared in full in the *NEW PHILOSOPHY* during the past year, though possibly we shall print some supplementary matter pertaining thereto during the coming year; we have also in hand a complete MS. index to the whole work. Although this remarkable work has been twice translated and four times printed, yet it is among the least known of all Swedenborg's writings, and is so rare as to be practically unobtainable. As noted in an article in the last issue of *NEW PHILOSOPHY* the work is of great importance in understanding that doctrine of correspondence, on which the full grasp of Swedenborg's philosophy so much depends. Among Swedenborg's MSS. has been found what appears to be a direct continuation of *Hieroglyphic Key*, namely, a work on correspondences and representations. This work consists largely of passages from the Scriptures, classified according to correspondences, with occasional brief comment. We had almost decided to include this work in the *NEW PHILOSOPHY*

as a continuation of Hieroglyphic Key,—although it is not well suited for the pages of a journal,—when the generosity of our Vice-President rendered this course unnecessary. Dr. Boericke has offered to defray the whole expense of printing the work in connection with the reprinting of Hieroglyphic Key, so that both works can be published in one volume at comparatively little expense to the Association. This book will make a valuable addition to our publications, and there can be no doubt that we express the thanks of the whole Association when we thank Dr. Boericke for his generous aid.

During the year we have decided to bring into better order the binding and indexing of the *NEW PHILOSOPHY*. Vols. 1 and 2 (1898-1899) were issued without title-page or index. A title-page was printed for Vols. 3-6 (1900-1903) together with an index for Vols. 1-6. A title-page and index were also printed for Vols. 7-9 (1904-1906). For volumes 10-13 (1907-1910) only title-pages were printed, but in 1910 we published an index for Vols. 1-13. Since 1910 neither title-pages nor index has been printed. We now propose to issue a separate title-page and index or table of contents for every three years, commencing with Vols. 12-16 (1911-1913) and continuing with Vols. 17-19 (1914-1916). To facilitate this work we have also adopted the policy since 1916 of continuing the paging of the journal for the whole of the triennial period. The January issue for 1917 is paged anew, being the commencement of Vols. 20-22. The title-pages and indices of Vols. 14-16 and 17-19 are now being prepared by Mr. Leonard E. Gyllenhaal. We hope to print them in the near future if the expense is authorized by the Association. Readers and librarians can then bind up their copies.

We do not wish to close this report without emphasizing the necessity of greater financial support being given to the work of the Association. The carrying out of the necessary work spoken of above will require not less than \$200, and it is clear from the Report of the Treasurer that the Association is not now able to defray this cost. Yet the work is of vital importance to our Association embodying, as it does, one of the two great reasons for its existence. As in the past, so now,

men are ready to freely and willingly give of their time and labor to the doing of the literary and business part of the work; but more than this is needed, and we appeal to the members of the Association to make some special contribution for the carrying on of our literary work; and especially for the completion of work in hand. That work consists of the presentation to the world and the New Church of the philosophical works of Emanuel Swedenborg, many of which are unprocurable, and even entirely unknown; it is a work which is of great importance to the student of to-day, and one that will make easier the task and richer the gains of the student of to-morrow. And let me add, that a more hearty support of this work by such of our members as are able to make special contributions, will not only ensure the prosecution of the work itself, but will also give to the workers added encouragement strengthened by the consciousness of the enthusiasm of our members in the aims for which the Association was established.

ALFRED ACTON.

May, 1917.

SPECIAL REPORT BY ALFRED H. STROH, M. A.

A general statement concerning the work in Sweden has been given in the editor's Annual Report, dated April 27th, and distributed to all the American and British societies interested. So far as the general conditions are concerned, nothing need be added to the Annual Report, but in view of some possible misunderstanding it should be observed that the phototyping account, and the account for the editor's salary, have never, since 1902 and up to date, been connected with the special accounts for the scientific and documentary series specified below. The British and American bodies have supported the phototyping and the editor at an increasing rate up to June 30th, 1916, it being understood that all other work was secondary. Although plans exist for the continuance of the phototyping after Vol. XVIII., the British interests desire to withdraw, and the American officials have unanimously taken the

position that no further work should be considered until the volumes previously authorized shall have been bound and paid for.

The editor's engagement having ceased on June 30th, 1916, he has been specially supported by contributions from Bryn Athyn, from the Academy of the New Church and from a private source, up to June, 1917, amounting to \$1,750, equivalent to the previous salary since 1910 of £360 *per annum*. This income for the present financial year must, however, also cover all travelling expenses from Sweden to America, in America, and back to Sweden. Further losses since the outbreak of the war have been caused by high prices, by the extraordinary fluctuations of the exchange, and by long delays in the payment of grants. The editor has thus far received no payment for the editing of the scientific and documentary series, having done that work gratis, but will receive small sums in the future for the volumes of the Stockholm edition *Opera de Rebus Naturalibus*, for Vols. III. and IV. of *The Brain*, and for the remainder of the *Chronological List*. But any honorarium of that kind will be received only after the publication of the works mentioned. It seems proper to make these conditions quite plain, for some American officials connected with the work in Sweden have supposed that the editor has been paid for other work than the phototyping, which has never been the case. As for the festival and other publications, they have also been done gratis, and are the property of the New Church Publishing Society of Stockholm and of the other bodies which issued them.

The above facts will explain how the work in Sweden has been financed up to date. Besides the phototyping there are to-day three separate publications in hand which are quite distinct from each other. They are:

1. Swedenborg's *Opera de Rebus Naturalibus*, three volumes of which have been paid for by Professor and Mrs. Gustaf Retzius. By volumes sold a Swedenborg Fund of over 4,000 kronor has been formed in the care of the Treasurer of the Royal Swedish Academy of Sciences. Half of Vol. IV. is also printed and paid for, and thousands of pages of copy

exist for the future volumes of the series, to contain most of Swedenborg's scientific works. The editor will receive kr. 20 per sheet of 16 pages for future volumes of this series. Subscriptions for each volume will pay for the next until the series is finished.

2. Vols. III. and IV. of *The Brain* lie in manuscript as edited by Tafel and Hyde. The London Swedenborg Society has agreed to pay Professor Ramström and through him the editor of the Stockholm series a sum per page to be fixed after further consultation. As the Latin texts of the Stockholm series will be of great value in revising for press the remainder of the English translations in *The Brain* much valuable work for both publications can be produced by the collaboration of the editor with Professor Ramström, who will also prepare Introductions for the Stockholm series.

3. After typewriting and distributing the remainder of the *Chronological List* the editor proposed that the small sum possibly unexpended of the fund subscribed for that work be retained by him for his prolonged editorial labors in this connection. While the publication of this work and of the collected documents in New Church periodicals will probably not be paid for, it may be that the final appearance in book form of these important and voluminous results of research and editorial labor will be made possible in such a way as to reimburse the editor for his travels and other expenses in this connection.

In presenting the above statement of the financial condition of the work in Sweden the editor hopes that through the good offices of the Swedenborg Scientific Association as in 1906, some arrangement for support can be made so that the publication of Swedenborg's texts at Stockholm may be continued.

Respectfully submitted,

ALFRED H. STROH.

New York, May 13th, 1917.

Addendum.

The editor's Annual Report and the Special Report now submitted, represent not only the result of much discussion in Bryn Athyn, New York and Boston since January, 1917, but also special plans evolved during recent meetings with the individual members of the Board of Directors of the Swedenborg Scientific Association in Bryn Athyn and Boston. It has furthermore been suggested, and the suggestion has been favorably received in Boston and Bryn Athyn by a number of officials, that before the meetings of the General Convention and Swedenborg Scientific Association an informal meeting of representatives of all American bodies hitherto supporting the work in Sweden be held in Philadelphia next Saturday morning, that date having been suggested by Mr. B. A. Wittemore as the most convenient. The meeting proposed might be called by the officials of the Swedenborg Scientific Association; as the Association's representative abroad since the year 1904 I venture to raise the question.*

A. H. S.

Bryn Athyn, Pennsylvania, May 14th, 1917.

*In accordance with the suggestion here noted an informal meeting of the nature spoken of was held at the Sunday School Room, 22d and Chestnut streets, Philadelphia, Pa., on May 19th. It was attended by representatives of the General Convention, the Academy of the New Church, the

American Swedenborg Society, the Rotch Trustees and the Swedenborg Scientific Association. The meeting was a purely informal conference as to the means for continuing the phototyping work. [EDITOR, *New Philosophy*.]

MEMORIAL
TO THE
GENERAL CONVENTION
AND THE
ACADEMY OF THE NEW CHURCH
FROM THE
SWEDENBORG SCIENTIFIC ASSOCIATION.

The SWEDENBORG SCIENTIFIC ASSOCIATION was established in 1898 for the purpose of preserving, publishing and propagating the scientific and philosophical writings of EMANUEL SWEDENBORG. In the same year the Association was recognized by the General Convention, sitting in Cleveland, Ohio, as the body peculiarly fitted for carrying on the work of promoting a knowledge of Swedenborg's scientific and philosophical writings. The same recognition was extended to the Association by the Academy of the New Church; and both bodies have more than once testified to their interest in the work of the Association by a generous grant of financial assistance.

Strengthened by this moral and material support the Swedenborg Scientific Association has been enabled to accomplish a large amount of work. It has published a great number of translations of Swedenborg's earlier writings, many of them never previously translated; it has secured the transcript of thousands of pages of Swedenborg's unpublished scientific and philosophical manuscripts, and, indirectly, it has been instrumental in the inauguration by the ROYAL ACADEMY OF SCIENCES of Stockholm, of the magnificent edition of Swedenborg's scientific works in the original texts, which is now being published by that body,—which latter work was made possible by the presence in Sweden of Mr. Alfred H. Stroh.

Mr. Stroh was first sent to Sweden in 1902, when he was supported by the Academy of the New Church, and the General Convention, for the purpose of superintending the phototyping of the SPIRITUAL DIARY, and also, at the instance of the Swedenborg Scientific Association, of supervising the transcript of

Swedenborg's scientific manuscripts,—a work, to the support of which the Academy and the Convention had liberally contributed in the preceding year. The time of Mr. Stroh's arrival in Sweden was most auspicious. Earlier in the year, members of the Royal Academy of Sciences had commenced an examination of the Swedenborg manuscripts; but owing to the difficulties encountered the work had been abandoned. With the advent of Mr. Stroh, however, the matter was again taken up. The Royal Academy at once recognized Mr. Stroh's capabilities as an editor of Swedenborg's manuscripts, and soon after his arrival, this illustrious body appointed a committee, composed of the most eminent Swedish scientists, to make a thorough examination of the manuscripts with a view to their possible publication. The distinguished *personnel* of this committee, whose members were Professor Retzius, Professor Loven, Professor Svante Arrhenius, Professor Nathorst, and Professor Henchen, sufficiently indicates the importance attached to this undertaking by the Royal Academy of Sciences.

But Mr. Stroh could not long remain in Sweden, and though he paid a second visit to that country in the summer of 1905, it was early recognized that the publication of the edition proposed by the Royal Academy could not be successfully carried out unless he could be stationed there for a continuous period. Therefore, in 1906, the Swedenborg Scientific Association memorialized the Academy of the New Church, the General Convention, and other bodies of the New Church, with a view to securing the financial support of Mr. Stroh during a prolonged stay in Sweden. The response to this memorial was both immediate and generous. Both the Academy of the New Church and the General Convention made a special grant for the purpose of enabling Mr. Stroh to reside in Sweden with a view to his editing the Royal Academy's edition of the scientific works.

Since that year, 1906, this assistance to Mr. Stroh has been continued; and when in 1910, the Academy and the Convention united with other bodies of the New Church in resuming the phototyping of Swedenborg's theological manuscripts, the financial support given to Mr. Stroh was largely increased. Mr. Stroh's continued stay in Sweden, thus rendered possible,

has been fruitful of rich results. The Church has secured thousands of pages of phototypes of Swedenborg's theological manuscripts; the Royal Swedish Academy of Sciences has been able to publish three volumes of its magnificent series of his scientific and philosophical writings; and Mr. Stroh has availed himself of the opportunity to collect and copy a large number of new documents relating to Swedenborg and the early history of the New Church, which will be of priceless value to the student,—documents, the importance of which will, in the near future, necessitate a complete new edition of the Documents concerning Swedenborg.

It should be noted, however, that while the above important works have been accomplished by Mr. Stroh,—and this with the willing co-operation of the contributing bodies,—the principal work for the sake of which he has been supported, has, since 1910, been the phototyping of Swedenborg's manuscripts. But now,—although many of the manuscripts are still unreproduced and the completion of the work will require many years,—it has been found necessary, owing to a variety of causes, to temporarily suspend the work of phototyping. The Swedenborg Scientific Association is fully aware of this necessity; but, as the body peculiarly devoted to the publication of Swedenborg's scientific and philosophical writings, it is anxious that the temporary suspension of the phototyping shall not result in the suspension also of Mr. Stroh's other work, and especially of that noble edition of Swedenborg's original texts so liberally undertaken by the Royal Swedish Academy of Sciences.

For the purpose of publishing this edition the Royal Academy has in the past voted appropriations as occasion required, and doubtless, it will do so again. The Royal Academy holds at present a sum of 4,000 kronor (over \$1,000.00) for the purpose of the immediate continuation of this publication; and last year it appointed Mr. Stroh as the official editor of the series with a small honorarium. It is manifestly essential to students of Swedenborg that this edition shall be completed; and to all Newchurchmen it is a matter of importance, or at least of the greatest interest, that a learned body, such as the Royal Academy of Sciences, should widely proclaim

Swedenborg's works as meriting the study of the most advanced modern cosmologists and anatomists. Such proclaiming and such publication must surely redound to producing a state more favorable for the presentation of Swedenborg the Theologian. It has already greatly strengthened the cordiality existing between the Swedish authorities and the bodies of the New Church represented by Mr. Stroh,—a cordiality which has been manifested in the willing co-operation of these authorities with New Church bodies in the securing of documents by and concerning Swedenborg, in the reproduction of his autograph manuscripts, and in the public honoring of his name in England and Sweden.

Mr. Stroh has stood before the Royal Academy of Sciences as the duly accredited representative of bodies of the New Church, and to retain him as such representative will undoubtedly go a long way to preserving and continuing the valuable co-operation hitherto obtaining, and to ensure the completion of the series of publications commenced by the Royal Academy. Without Mr. Stroh's services, it is indeed extremely doubtful whether this series will be continued at all, at any rate for many years to come; there would be a real and imminent prospect that the whole work in Sweden will be suspended indefinitely.

As further evidencing the importance of supporting Mr. Stroh in Sweden, we would note also that the phototyping of Swedenborg's manuscripts is still far from complete, and therefore must again be resumed as soon as favorable opportunity offers. For this reason it is highly important that Mr. Stroh's services be retained. His whole life has been devoted to this work; his whole training has prepared him for its successful prosecution; his knowledge of Swedish, his familiarity with the Swedenborg manuscripts, his standing among the learned and influential men of Sweden,—all indicate that he is by far the most capable man in the New Church to be entrusted with this important undertaking. It is only the part of prudence to retain Mr. Stroh's services, that when the opportunity arrives to continue the phototyping, the work may be recommenced with the least possible delay.

Moreover, there is that other work for which Mr. Stroh

is so eminently fitted; we mean, the investigation and discovery of documents by and concerning Swedenborg, and to the completion to his compilation of the Chronological List. Mr. Stroh's past investigations in Sweden, England, France, Holland, and other countries, and also his knowledge of languages are an invaluable asset in the prosecution of this work; and the importance of the work itself will be at once recognized when it is recalled that more than one work which Swedenborg is known to have written has never been discovered.

The Swedenborg Scientific Association, however, is more immediately interested in securing the continuation of the Royal Academy's edition of Swedenborg's scientific works, and it points out the other reasons for the retention of Mr. Stroh's services in Sweden, merely for the purpose of showing the wide extent of the field of work which Mr. Stroh might cover.

The Royal Academy's edition is to be comprised in seven large quarto volumes, printed in a style worthy both of the illustrious author and of the learned publisher. Three volumes of the series have already appeared, and the remaining volumes are to include the *Dædalus Hyperboreus*, *The Brain*, *Economy of the Animal Kingdom*, and *Animal Kingdom*. Volume IV. is now more than half printed, and the money already appropriated is more than sufficient to complete this volume.

In view of the considerations recited above, the Swedenborg Scientific Association, therefore, respectfully petitions the Academy of the New Church for the grant of the sum of \$900.00,—being one-half of the compensation hitherto paid to Mr. Stroh;—the Association is also petitioning the General Convention for the granting of a like amount; the purpose of the petition being that the Association may engage the services of Mr. Stroh for one year in Sweden, with special view to his continuing the editing of the Royal Academy's series of Swedenborg's works.

If the Association's petition is granted, the Association on its part undertakes to assume general supervision of the work; to co-operate as far as possible with its speedy progress; and to procure subscriptions for the books of the series as they are published. Mr. Stroh will keep in constant touch with some

designated official or officials of the Association, and will thus give them every possible opportunity to co-operate in the work. And Mr. Stroh is certain that with efficient and sympathetic co-operation he will be able, during the year of his engagement, to publish Volumes IV. and V., besides making preparation for the continuance of the series.

This Memorial is respectfully submitted to the General Convention and to the Academy of the New Church by the undersigned, acting on behalf of the Swedenborg Scientific Association.

LEWIS F. HITE,
President.

May, 1917.

Bryn Athyn, Penna., May 22, 1917.

SWEDENBORG'S PSYCHOLOGY.

PRESIDENTIAL ADDRESS BY LEWIS F. HITE.

At our last annual meeting we surveyed our field of work, work accomplished and work yet to be done. We reminded ourselves that after publication and translation there must follow the study, interpretation and promulgation of Swedenborg's science. We discussed at some length the proposal to issue a Swedenborg Primer, which would aim to present his science and philosophy in a brief and simple form adapted to the general reader. We suggested that the day was not far distant when the *New Philosophy* would find its proper field as the organ of systematic study and exposition of Swedenborg's scientific doctrines.

It is in the direction of these thoughts that I have chosen for my subject on this occasion *Swedenborg's Psychology*.

There is, as we must all recognize, a peculiar fitness in selecting this topic as characteristic of Swedenborg's work in the field of science. For while his psychological studies and achievements were by no means limited to this period, in fact, the incomparably most important part of his psychological doctrine is to be found in the later period, the period of his

spiritual illumination; nevertheless, we, as a scientific association, are more directly interested in his scientific labors. We do not forget the monumental work he did in the field of the physical sciences, culminating in the *Principia*, which must sometime receive systematic attention; but what I want to emphasize now in the selection of this topic is that it was in the field of psychology that Swedenborg put forth the supreme effort of his intellectual life for a period of more than ten years. In this period he devoted himself with marvellous energy to the study of physiology and psychology in search of the soul.

In physiology he produced those monumental books, *Economy of the Animal Kingdom*, *Animal Kingdom*, and *Brain*, besides multifarious special treatises in this field. The single aim of this prodigious and persistent labor was to come face to face with the soul. His labors in this direction culminated in the *Rational Psychology*, though in *Worship and Love of God* he pursued the same subject in an imaginative and poetic way.

The Animal Kingdom, as Swedenborg meant it, was really the kingdom of the soul, *Regnum Animæ*, not *Regnum Animale*. His motto was, the soul must be sought in her kingdom, namely, the animal body, in particular the body of man. Here, then, he began, and he explored the body in all its details, organs and functions with a thoroughness and completeness unparalleled. His procedure was determined by the theory that the soul descended into the body by successive steps, degrees; and accordingly the natural order of pursuit was to mount up the steps in reverse order.

It is characteristic of Swedenborg's view of man and nature, that there is a correspondence between the tissues and organs and functions of the body, and the constituents and activities of the material atmospheres. The consequence is that Swedenborg's physiology, as likewise his psychology, is not to be understood apart from his physics, the doctrines of the *Principia* as well as the doctrines of the *Economy*. We must, therefore, go back to the *Principia* period for our starting point.

The earliest intimation of Swedenborg's interest in psychological questions appears in the color theories set forth in the

Chemistry and Miscellaneous Observations. A remarkable passage in the latter, seems to have direct reference to Hobbes and his theory of sensation. "I do not know," he writes, "why those persons (apparently Hobbes and his followers) should be mistaken who maintain that sensations are merely vibrations, or very subtle motions, in the membranes of our frames." The theory here broached with some hesitation and ambiguity is elaborated in the later works with great scientific detail.

In the introductory chapter of the *Principia* we have a large scheme of psycho-physics and a close analysis of the process of knowledge. The aim is to set forth the way to true philosophy and the nature of the true philosopher. The philosopher is the man whose constitution is so exactly correspondent with that of the outer world around him that his knowledge of the world is natural and spontaneous. This was the case with man as he came originally from the hand of his Maker, but unhappily he fell from this high estate, and he needs to bring himself into harmony again with the external cosmos.

This is done by re-establishing the way of communication between soul and body. The means of this communication is the rational mind. When the rational mind is educated and perfected through experience and training, the soul has an open way to the sense mind and becomes mediately and immediately aware of all that takes place in it. On the other hand, the things of the sense mind pass up to the soul and, so to say, report to the soul. So far this whole scheme is mechanical, a system of particles and motions. Knowledge seems to be conceived as a transference and transmission of states of moving particles. This theory, which first took form as the Bullular Hypothesis proposed in *Miscellaneous Observations* is made use of to connect the constitution of man with the outer world, and to extend the range of knowledge to the entire realm of motion. The particles of the atmospheres, the aura, the ether, and the air, penetrate the organs of the human body and communicate their motions to the particles of which these organs are made. In this way is established a continuous flow of motion and changes of state through the body and the rational mind to the soul itself.

So now we have one complete inter-connected mechanical system. Knowledge is the sensitiveness and awareness of the soul to all the changes that occur throughout the system, for these changes are motions conveyed to the soul by a continuous body of particles.

It is doubtful if Swedenborg ever completely abandoned this psycho-physical theory. There are strong suggestions of it even in *Divine Love and Wisdom*.

The connecting link between these discussions in the *Principia* and the more elaborate ones of the *Economy* is the work on *The Infinite*. In working out the mechanical theories in the body of the *Principia*, Swedenborg touched on the question of creation, and became interested in the connection between the infinite and the finite.

In the works on *The Infinite*, a systematic attempt is made to work out this problem, and the question as to the nature of the soul recurs in the form of a theory of final cause. The view here is, in brief, that the final cause and ultimate effect of creation is man, body and soul; and the connection between soul and body, namely, the rational mind, is involved as a means of making the ultimate effect complete.

At this point Swedenborg tries very hard to bring the soul within the field of mechanics, but in the end he is dissatisfied with the result. So we have in the final paragraph of this treatment of the soul a forecast of the scheme of the *Economy*.

With the *Economy*, Swedenborg begins his systematic pursuit of a more precise knowledge of the soul with a fully developed technical apparatus, and the outcome was the whole body of works on physiology and psychology. Throughout the whole of the physiological works the view is maintained that the soul is the first simple animal substance, and from this substance by composition and recomposition the animal body is built up. This substance is derived from the still higher first simple substance of nature, which is the direct creation of God, and is impressed by the Creator with all the powers that are later developed in its successive composite forms and activities. Here we have a complete mechanical system from the highest, the first simple substance of nature, to the lowest, the bodies of animals, plants and minerals.

There is one point in this system where Swedenborg is constantly puzzled, and where his language is ambiguous, the point where consciousness comes in. The doubt arises as to whether the soul alone is conscious, or whether the motions that pass up along the ladder from sense organ to soul are themselves the sensations which, when they reach the soul, become most distinct, that is, most fully conscious. The doubts and questions as to the nature of intelligence, so significantly injected into the Principia discussion, suggest that at this point Swedenborg shifts from the physiological to the psychological point of view. The same apparent shifting is observable later in the *Economy*.

In the *Economy* Swedenborg goes to work deliberately to sketch a physiological theory as an introduction to rational psychology. The doctrine of series and degrees, previously hinted at, is here made a principle of method.

The soul here is somewhat tentatively identified with the animal spirit, or the spirituous fluid, the first simple animal substance. It is significant that Swedenborg in this connection introduces a preliminary discussion of the brain, thus anticipating the later work and some of the discussions of *Rational Psychology*.

The question of prime psychological importance at this stage, the *Economy* stage, is whether the animal spirit is itself conscious, or whether the soul alone is conscious, and, in and through the animal spirit, is also conscious of the lower bodily states and conditions. Swedenborg seems, in fact, to shift from one of these positions to the other; so that it would be an easy matter to make out either alternative. The truth is that at this stage Swedenborg's language suggests that he actually took now one position and now the other. In other words, he now thinks in physiological terms and now in psychological. There seemed to be hovering before his mind all the while the notion of correspondence which was brought forward more distinctly in the *Rational Psychology*.

With this notion of correspondence in mind, it may be said that the animal spirit is the physiological representative of the soul, and the soul is the psychological factor in the animal spirit. But this whole doctrine of the soul as animal spirit

and animal spirit as soul needs to be worked out in detail with a very complete historical, physiological and psychological equipment; for it is at this point that Swedenborg comes nearest to current psycho-physical theories, especially the behavioristic theories.

When we come to the doctrines of the *Rational Psychology* we pass over more distinctly into the psychological realm.

It is an interesting fact that here the critical point for psychology is also the critical point for metaphysics, namely, the nature and function of sense images. We must ask here, are sense images physiological facts, or are they mental facts? In other words, are they physiological states and conditions, or are they mental states? This is no easy question to answer in Swedenborg's terms. He speaks of the *image* as passing along the physical and physiological series, for instance, along the ether waves, eye states and nerve motions, up to the brain; there to become the beginning of a new set of operations, operations strictly mental, or, at least, described in psychological terms.

A series of brain states finer and more interior as they ascend from lower to higher orders of structure and activity are placed in correspondential relations to mental functions, designated in general as sensation, imagination, perception and intelligence. This is the psycho-physical scheme of the *Rational Psychology*. The scheme is simple in outline but it is by no means simple in detail. If we undertake to trace sense-images up through imagination and perception to intellection, we encounter an exceedingly complicated psycho-physical situation. He speaks of the sense-image, image of the orange, for example, as passing along the course of the ether waves, the eye structures, the nerve, and up to the brain center, and there it *is*, or—and here is the standing ambiguity of language—it *corresponds* to, the brain state. At this point the situation becomes highly involved. The sense image, the orange as object, or to speak more precisely, the color of the orange, the orange as seen, *becomes*, by a process of transformation in the brain cell structure and activity, the *image* in or before the imagination,—the orange, or rather the orange color as imagined,

the idea of the orange. It is the difference, to speak in terms from actual experience, between seeing the orange with the eyes open and seeing it with the eyes shut. We say in the one case, that the object, the orange, is before us; in the other, that we have the idea of the orange in mind.

There are at least three puzzles in this account. First it is inconsistent, in fact, impossible to conceive the orange color passing along the stream of ether waves to the retina. In other words the ether waves are not to be thought of as colored. In the second place, it is inconsistent and impossible to think of the patch of orange color passing from the retina along the optic nerve to the brain center. The physiological substances and states of retina, nerve, and brain cell, are not colored, at least they are not of the orange color. In the third place, it is impossible to pass in thought from brain state directly and continuously to color sensation. The two facts, the brain state and the color sensation, are facts of different order. There is no conceivable theoretical connection between them. For thought, at least, the conjunction is empirical and external. The physical and physiological series afford no clue whatever to the origin, the occurrence, or the nature of the color sensation, and to the series of mental states which follow upon it.

Once over on the mental side, it is a mere matter of introspective detail to trace, order, and systematize the mental happenings which we class under the heads of sensation, imagination, perception and intellection. But their physiological correlates form disparate series.

To my mind, it is doubtful if the facts of this psychophysical situation can be properly described in the terms which Swedenborg had at his command. I am inclined to think that we need to revise and reconstitute both our psychology and our metaphysics, and reconstruct the body of our conceptions and our vocabulary before we may hope to deal successfully with the problem here presented to us. It seems to me that we must go over to Swedenborg's spiritual philosophy, and then work back through psychology to physiology, and even to physics. This to my mind is the problem of New Church philosophy.

THE TRUE PHILOSOPHER.

BY EMANUEL SWEDENBORG. (*Abridged.*)

4. By a true philosopher we understand a man who, by the means above treated of, is enabled to arrive at the causes themselves and at the knowledge of those things in the mechanical world which are invisible and remote from the senses; and who is afterwards capable of reasoning *a priori*, or from first principles or causes, concerning the world and its phenomena, both in physics, chemistry, metallurgy and in all other sciences or subjects which are under the empire of the mechanical principle; and who can thus, as from a central point, take a survey of the whole mundane system and of its mechanical and philosophical laws.

Were it possible by such means first to bring to light elemental nature, afterwards the nature of the metallic kingdom, then that of the vegetable, and finally that of the animal, how great would be the advantages which the world would reap from the discovery! For if we knew *a priori* the cause of the things observable in these kingdoms, and were able to dissert upon them, commencing with the same principles and causes from which nature herself brings forth and manifests her phenomena, everyone might then know the objects which nature has in view; everyone might then give responses, as from the inmost recesses and from behind the veil of Nature's temple.

But if anyone is content with devising mere principles, and is so indulgent to his imagination as not to look to the evidence of them in geometry, nor to concern himself about their agreement with physical facts; or if he forms to himself a particular theory for each series of phenomena, and for each series of experiments contrives new links of connection, and when his fragile ties give way, endeavors to restore their coherence with clumsy knots,—can such a one be ever admitted to the oracles? Surely nature will only smile at him as a visionary who bestows his labor on dreams.

THE PHILOSOPHER IN THE STATE OF INTEGRITY.

No man seems to have been capable of arriving at true philosophy since the age of that first of mortals who is said to have been in a state of the most perfect integrity, that is to say, who was formed and made, according to all the art, image, and connection of the world and philosophy, before the existence of vice. All of us who are governed by a right mind aspire after, and are intensely desirous of arriving at the same goal and the same degree of wisdom as at a something which we have lost; but how far it is possible to succeed, none but the true philosopher can see; he who is only in part a philosopher, or who wishes to be reputed one, may suppose himself to arrive at the goal and even to have proceeded beyond it, while his fancied wisdom is after all mere hallucination.

The reason why man in the state of integrity, was made a complete philosopher, was that he might the better know how to venerate the Deity,—the origin of all things, that Being who is all in all. For without the utmost devotion to the supreme Being, no one can be a complete and truly learned philosopher. True philosophy, and contempt of the Deity, are two opposites. Veneration for the Infinite Being can never be separated from philosophy; for he who fancies himself wise, while his wisdom does not teach him to acknowledge a Divine and Infinite Being, that is, he who thinks he can possess any wisdom without a knowledge and veneration of the Deity, has not even a particle of wisdom. The Philosopher sees indeed that God governs His creation by rules and mechanical laws, and that the soul governs the body in a similar manner; he may even know what those rules and mechanical laws are; but to know the nature of that Infinite Being from whom, as from their fountain, all things in the world derive their existence and subsistence,—to know, I say, the nature of that supreme Intelligence with its infinite arcana,—this is an attainment beyond the sphere of his limited capacity. When therefore the philosopher has arrived at the end of his studies, even supposing him to have acquired so complete a knowledge

of all mundane things that nothing more remains for him to learn, he must there stop, for he can never know the nature of the Infinite Being, of His supreme intelligence, supreme providence, supreme love, supreme justice, and of his infinitely other attributes. He will therefore acknowledge that, in respect to this supremely intelligent and wise Being, his knowledge is nothing; he will then most profoundly venerate Him with the utmost devotion of soul; so that at the mere thought of Him his whole frame or membranous and sensitive system, will awfully yet sweetly tremble from the inmost to the outermost principles of its being.

NATURE, THE WORLD, AND THE INFINITE.

As nature is the first beginning of the changes that occur in the world or mundane system, or, as nature is the motive or active force or collection of forces by which those changes are occasioned, it follows that the world is dependent on nature and inseparable from it, and that the world is nothing without nature, and nature is nothing without the world. But the Infinite is still the Infinite, independently of the world; while, on the other hand, no conception of the world can be had independent of the Infinite. We see then that nature cannot be without the world, but that the Infinite can, and that He may be a Being capable of being separated from the world; we see also that all things were produced by Him, that the world was created by Him, and with the world nature herself.

Nature is only a word which expresses all the motive forces proceeding from the first motion of the Infinite till the world is completed. With this first motion it begins; and as this is produced by the Infinite so also must nature; they therefore are mere children, and have reached scarcely the first threshold of true philosophy, who ascribe to nature the origin of all things, to the exclusion of the Infinite; or who confound the Infinite and nature together; when yet the latter is only an effect, a causate, a thing caused, the Infinite being its efficient and cause. Nature, however, when once produced, may be called the efficient and cause of the world, in so far as all

things afterwards successively exist by derivative motive forces and modifications; but it cannot be called the first cause.

Thus true philosophy leads to the most profound admiration and adoration of the Deity; nor can anything be found to diminish, but infinite things to increase this admiration; as when a man sees that all things are of the Infinite, and that in respect to the Infinite, he himself, as a finite being, is nothing; when also he sees that all his own wisdom and philosophy are, in respect to the Divine, in the same proportion as the finite to the infinite,—that is, as nothing.

THE CREDIBILITY OF MIRACLES.

Neither does true philosophy detract at all from the credibility of miracles,—all things being ascribed to Divine omnipotence, as the origin of the world and its foundation by such contingent means and successive mutations. No contingent means tending to the perfection of the world can exist which is not a miracle. The world itself is a miracle; whatever exists in any of its kingdoms, whether in the animal, the mineral, or the vegetable, exists by a miracle, because it exists by a contingent means which, by a series of others, is terminated in the Infinite itself, as in the first cause of all contingent means. For it cannot be denied that the intermediate causes and changes proceed successively from the supreme Being who produces all things in the most perfect manner, and conducts them to their destined end. Now, what He thus produces by contingent means and causes cannot be said to be contrary to the order of universal nature, but according to it; and although there should appear some things that are not in conformity with the nature of our world, are not agreeable to the mechanism of our mundane system, yet, even in this case, they must exist from certain causes, which like the world itself, derive their origin from the Infinite alone.

All things which exist in any other world, were they to occur in our own would be miracles, as being contrary to its laws of motion, notwithstanding their being in their own world perfectly natural. In short, if a miracle exists, it exists from the Infinite; if from the Infinite, it exists by means of causes.

Miracles may also exist which are agreeable to the mechanism of our world, and others which are contrary to it; but neither can be produced but by some one or other active infinite principle of which we can form no idea, and of which, consequently, we cannot understand the cause.

THE STATE OF INTEGRITY AND THE STATE OF PERVERSION.

But the reader may probably wonder why I affirmed at the beginning of this discourse, that all our wisdom or true philosophy must be acquired by the use of means; and that the way to reason and to things prior is to be opened by experience or a *posteriori*; thus, that our body and external senses are our only teachers and leaders, leaving but little to the mind, from which, nevertheless, as its fountain, all reasoning must proceed, or to which all things must have reference. I will therefore draw a picture of the two states of man: first, of his state of integrity, which was most perfect, and then of that perverted and imperfect state in which, as degenerate mortals, we live at this day. From such a comparison it will probably appear that it is only by the use of the means above mentioned, that the way to the most subtile active principle of our nature can be opened; and that this way must be prepared by mere experience.

THE STATE OF INTEGRITY.

To begin, then, with man in his state of integrity, and complete perfection. In such a man we may conceive to have existed such a complete contiguity throughout the parts of his system, that every motion proceeding with a free course from his grosser parts or principles, could arrive, through an uninterrupted connection, at his most subtile or active principle, there being nothing in the way which could cause the least obstruction. Such a man, may be compared to the world itself in which all things are contiguous from the sun to the bottom of our atmosphere. Thus the solar rays proceed with an uninterrupted course, and almost instantaneously, by means of the contiguity of the more subtile or grosser elements through which they pass through the ether into the air, till they arrive at the eye and operate upon it, by virtue of such con-

nection, as if they were present; for contiguity occasions the appearance of presence. When, therefore, the most subtile active principle of man, by the providence of God, clothed itself with a body, and added by degrees part upon part, all the motions in the most subtile element which were present, would necessarily move or affect that most yielding and tender substance, and would gradually impress themselves and their own mechanism upon it. So also would the motions in the grosser elements, such as the air; for the air, always moving and undulating around, and perpetually acting upon the same substance, also forms to itself something similar, and, by its continual motion, causes itself, as in the case of the other elements, to be received within. The like would occur in regard to whatever was unevenly fluent in the air; for the atmosphere is always stored with the effluvia of vegetables, etc.; this, therefore, by its continual contact, would form its own mechanism in the sense of smell. In a word, during the growth of the tender parts possessing motion and life, every motion that was perpetually present, must necessarily have left vestiges of itself, and consequently have naturally formed its own mechanism, so as afterwards to be received still more interiorly, but in the same manner as in the tender substances. The man thus formed, in whom all the parts conspire to the motions of all the elements, and to convey them successively, when received through a contiguous medium, to the most subtile active principle, must be deemed the most perfect and the first of all men, being one in whom the connection of ends and means is continuous and unbroken. Such a most perfect material and acting being would in a short time acquire by the aid of the senses alone, all the philosophy and experimental science natural to him; for whatever could present itself to his senses, would immediately flow by connection and contiguity to his most subtile and active first principle. Thus whatever presented itself to the eye would immediately flow through the little membrane put in motion by its undulations, to those successively more subtile, till it arrives at the most subtile principle.

As, therefore, the whole man was constructed according to

the motions of the elements ; and as those motions were capable of arriving without interruption, through a medium so contiguous and tense, at the most subtile active principle,—what conclusion can we draw, but that such a man must have enjoyed the most complete, perfect, and distinct faculty of reasoning ; that all the mundane system or motions of the elements must have been familiar to him after a little contemplation and custom ; that every relation of their motion, being impressed upon all his organs, as it were, naturally and from his tender infancy, would be felt with perfect regularity from his external parts or senses to his soul ; and that the soul, being furnished with such a body, would naturally be so well acquainted with geometry, mechanics and the mundane system, as to be able to instruct herself, without a master, from the simple contemplation of the phenomena of nature and the objects of sense.

THE STATE OF PERVERSION.

Let us now consider the perverted and imperfect state of man, or that into which we are born at this day. In this state we see that no complete knowledge of anything can be acquired without the use of means. We see that nothing can penetrate to the ultimate active principle, or to the soul, except by means of continual experiments, by the assistance of geometry, and by the faculty of reasoning to be thus acquired ; we see that the way which leads to this most subtile and intelligent end is almost entirely closed, and is capable of being opened only by continual cultivation and exercise ; that is, by perpetual experiment and the practice of philosophising, and by the faculty of reasoning thence acquired ; we see that even then the way is not,—as it was in the state of integrity,—so open, as to preclude the necessity of continual experiment, and practice, by means of which, as by things constantly present in the memory, all motions or affections, may be remitted to the most subtile principles of our organization, and the passages thus kept, as it were, constantly permeable and open. For the nature of man's state at this day, and its dissimilitude from his former state is well known ; how possessed he is by emotions

or affections quite foreign to rationality; how continually agitated thereby are his organs; how his interior texture has suffered violence from different vices, by which the connection between his more subtile and grosser principles is drawn asunder, distorted, and rendered less contiguous than before.

PHILOSOPHY AND THE VENERATION OF THE DEITY.

I have affirmed that, in his state of integrity, man was master of all philosophy, or mundane science, and this, too, of himself, by virtue of a perfect mechanism of his organization, that is, by nature; and that, being furnished with such excellent senses, nothing could be concealed from him, because he was formed according to all the motions and operations of the world and nature. I have said further, that nothing could exist in the world from the regular connection of causes, which could not instantly flow as through a most clear and pellucid medium, with a certain sensation, to the mind; that is, that all the sensation of each of his organs would penetrate to their most subtile principle without retardation, confusion or obscurity. But when every modification in the world, of whatsoever nature, had thus arrived at its ultimate, or at his soul, it necessarily follows that his knowledge and attainment would there stop, and that he would regard and venerate with a most profound admiration, those other and infinite things that exceeded the bounds of his intelligence; that is to say, that most vast Infinite, infinitely intelligent, infinitely provident, which begins where man and his finite faculties, intelligence and providence terminate; he would see that in this Infinite all things have their being, and that from it all things have their existence. As, therefore, all his sensations thus necessarily penetrated to their ultimate seat without any intervening obstacle, and there subsided into a most profound veneration, it follows that this most perfect man's veneration of the Deity was of equal extent with his wisdom, and as constant as the operation of his senses. We may therefore conclude, that the more profound is any man's wisdom the more profound will be his veneration of the Deity. No one also could be better acquainted than that first and wisest of men with the infinite

grace of the Deity ; whence it follows, in the same manner, that the Deity must also have been the supreme object of his love.

But the contrary to all this must necessarily take place in a man not in a state of integrity, and in whom the connection above mentioned is disrupted. Such a man has not the wisdom, the veneration and adoration of the Deity, we have described ; and as his knowledge of the Divine benefit and grace is also imperfect in proportion to his deficiency, so neither can he have such love ; in a word, he cannot have any such veneration, adoration and love of the Deity, as was entertained by the wise first man, unless he receives them from another source, that is, immediately from grace. But whatever veneration, worship, and love may exist in a man so changed, and in whom the connection is broken by vices and cupidities, they can never be unaccompanied by fear, because he never can be without cause of fear. Neither can love be supposed to exist in God towards man after the connection is broken, but instead of love justice. The cause of fear in man, presupposes justice. Therefore, according to all reason, there would have been no love in God towards man in his unconnected and discontinuous state, but only justice, had not the infinite and Only Begotten been made man, that in Himself as a man, and consequently, through a certain connection with Himself, in those who are like Him, He might restore this connection with the Infinite.

THE NEW PHILOSOPHY.

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THE NEW PHILOSOPHY OF CREATION.

BY EDWARD CRANCH, M. D.

To one brought up in the glorious light of the Lord's Second Coming, now revealed to mankind in the Writings of Emanuel Swedenborg, it is hard to believe how dense is the darkness of the Christian world wherever this light of the Second Coming is not permitted to shine, but where it is rejected of men and crucified, even as the Lord was rejected by the Jews, when He abode upon earth.

Asking almost any one in modern life what he or she understands by the first sentence in the Bible, "In the beginning God created the heavens and the earth," the answer will be, God created the universe "out of nothing."

The old traditional stories of creation, found among the simple and savage races, do not any of them convey this idea, but they assume varying forms of a general Chaos, something as expressed in the second verse of the Bible, "And the earth was without form and void, and darkness was upon the face of the deep. And the Spirit of God moved (or brooded) upon the face of the waters."

Blank naturalists, like Tyndall, Huxley and Spencer, have assumed a sort of "Chaos from eternity," which, by its own internal forces, of undefined nature, "evolved" the universe, with its three kingdoms of mineral, vegetable, and animal life, in the midst of which arose man as a sort of by-product, not contemplated by the original "Creator" if there ever was such a Being! These men, and many of their disciples, unite in believing in no future state of existence for the souls of men, and no future of any kind except the dreams of what may happen in extended "evolution;" whatever that may be.

Perhaps it is better to believe in *something* eternal, than to accept the dogma of creation as "production out of nothing."

To show that the idea of creation as "production out of nothing" has a very firm hold upon modern thought, take a few definitions from works of reference.

Webster's Dictionary, of 1909, gives the following, "Create, to bring into being, to cause to exist,—said especially of the divine fiat by which the world is regarded as brought into being out of nothing." Genesis i, 1, is then quoted.

The Century Dictionary, of 1911, says, "Creation: 1. The act of creating, or causing to exist, especially the act of producing both the material and form of that which is made; production from nothing—specifically, the original formation of the universe by the Deity." "Create: to produce out of nothing," (quotes Genesis i, 1).

The new edition of the Century is not just now accessible to the writer.

Hasting's Dictionary of the Bible in the course of its remarks mentions "the full dogmatic idea of creation, as production out of nothing."

Funk and Wagnall's Standard Dictionary, in its first edition, 1893, says, "Creation—the act of creating, production out of nothing, especially, the act of God in bringing the world or universe into existence." Then it quotes from John Weiss, (Immortal Life, ch. I., p. 18), "A personal volition in the proceedings of creation is as necessary to make the world in Darwin's way, as in that of Agassiz."

The same Dictionary, in the edition of 1914, improves slightly upon the older edition, thus,—"Create,—to cause to be or to come into existence, especially as distinguished from, or in opposition to, evolution, or the modifying of anything already existent." "Creation,—production without use of pre-existent material; especially in a theological sense, the original act of God in bringing the world or universe into existence." There is here no mention of "production out of nothing."

The Catholic Encyclopædia has a long article on Creation, full of the vaguest of opinion, in which it strives to explain

the old saying "*Ex nihilo, nihil fit*," and says, "what is peculiar to creation is the entire absence of any prior subject-matter—*ex nihilo subjecti*." It says again, "In technically theological and philosophical use, it (creation), expresses the act whereby God brings the entire substance of a thing into existence, from a state of non-existence. *Productio totius substantiae ex nihilo sui et subjecti*. Further on it says of creation, "it is not an emanation from the Divine substance, since the latter is utterly indivisible." Again it says, "That the material of which the universe is composed was created out of nothing, is the implicit, rather than specifically explicit statement of the Bible." And yet it refers to II. Macchabees, (so spelt in the Catholic Bible), vii, 28, which reads, "I beseech thee, my son, look upon heaven and earth, and consider that God made them out of nothing, and mankind also."

Spinoza, we remember, got over the difficulty by assuming that the whole universe, having been created by God, must have been so formed in His own substance, therefore, he says, "the whole universe IS God."

Now having looked a little into the darkness and perplexity prevailing in the world around us, let us refer to the Divine Revelation on the subject, so fully explained for the Lord's New Church.

In the work on "The Divine Love and Wisdom," Part Four, the following headings are explained in detail:

"The Lord from eternity, who is Jehovah, created the universe and all things of it, from Himself, and not from nothing. (282.)

"The Lord from eternity or Jehovah, could not possibly create the universe and all things, unless He were a Man. (285.)

"The Lord from eternity or Jehovah, produced out of Himself the Sun of the spiritual world, and out of it created the universe, and all things in it. (290.)

"There are three things in the Lord which ARE the Lord, the Divine of Love, the Divine of Wisdom, and the Divine of Use, and these three are presented in appearance outside

the Sun of the spiritual world; the Divine of Love by heat, the Divine of Wisdom by light, and the Divine of Use by atmosphere, which is the containant. (296.)

"The Atmospheres, which are three in both worlds, the spiritual and the natural, in their ultimates fall into substances and matters of the nature of earths. (302.)

"In the substance and matters from which earths arise, there is nothing of the Divine in itself, but still they are *from* the Divine in itself. (305.)

"All uses, which are the ends of creation, are in forms, and they accept forms out of substances and matter such as exist in earths. (307.)

"Evil Uses are not created by the Lord, but arose together with hell. (336.)

"The visible things in the created universe testify, that nature has produced nothing, and does produce nothing, but that the Divine out of itself, and through the spiritual world, produces all things. (349.)

"Without two suns, the one living and the other dead, there can be no creation. (163-166.)

"The spiritual sun is not the Lord, but it is the Proceeding out of His Divine Love, and out of His Divine Wisdom. . . . But because it is the nature of human reason not to acquiesce unless it sees a thing from its cause, thus unless it perceive *how*, in the present case how the sun of the spiritual world, which is not the Lord, but the Proceeding from Him, is produced, therefore of this also, something shall be said. . . . The angels said that the case of the spiritual sun is like the sphere of affections with their thoughts which encompasses each angel, whereby his presence is realized to others near and far, and that this ambient sphere is not the angel himself, but comes out of all and singular the things of his body, from which substances continually emanate in a stream, and the things which emanate closely environ him. . . . There is such a sphere around every angel because it is around the Lord, and that sphere around the Lord is in like manner from Him, and that sphere is their Sun, or the Sun of the Spiritual world. . . . That the same thing ob-

tains in the natural world (as in the spiritual world) is known from the experience of many of the learned—a wave of effluvia is continually flowing forth out of man, also out of every animal, and likewise out of every tree, fruit, shrub, flower, and even out of every metal and stone. The natural world gets this from the spiritual world, and the spiritual world from the Divine. (293.)”

Enough has now been quoted to show a little of the New Philosophy of Creation, although the subject of discrete degrees should be studied in this connection, too, whereby a better idea would arise as to how the steps of creation proceed from the Divine through the spiritual world into the world of nature, through the higher and lower atmospheres and other substances, which do not mingle, but are perpetually kept discrete, or distinct, in every step of creation. To call attention to only one instance of discrete degrees, we have the heavy atmosphere through which we breathe and hear, then the more subtle atmosphere that carries the Hertzian waves of the “wireless,” then the all-pervading ether, which fills the interplanetary spaces, and is, by its vibrations, the medium of light. None of these can by us be converted into the others, yet they proceed in regular series by separate “creative” acts, fulfilling the uses for which they were created, and for which they are conserved; for conservation is perpetual creation.

We must never think of creation as an act accomplished, and then set to “run itself;” for the Divine forces, acting through and from the spiritual world, must be eternally present in every iota of the universe of mind and matter, and always acting in the mind directly from the spiritual sun, and in outer nature through the agency of natural suns, each the center and source and preserver, under God, of its own solar system.

In the spiritual sense of the Word of God, as given in the New Church, the whole philosophy of the past can be illuminated and made straight, and so to that Revelation, given through Swedenborg, the whole world is invited to take heed and study.

MODERN PSYCHOLOGY.

BY J. B. S. KING, M. D.

Psychology may be defined as the science of mind, considered only as to its own processes, apart from their uses and values.

This definition distinguishes it from other mental sciences: from logic, for instance, which treats only of the truth or error of reasoning processes; from epistemology which is concerned with the sources of our knowledge or what is the same thing, with the truth and validity of our perceptions; from metaphysics* which treats of facts beyond physics or what some call "ultimate realities;" from ethics, which is concerned with the mind as related to morals; and from religion which deals with the relation sustained by man to God.

The mind has always been a mystery and a field of study and in all ages, the subject has been a difficult one; in every other science the object of study is easy to define; in Psychology it is difficult because it is internal, invisible, impalpable and in constant motion; it is difficult also because the thing studied and the thing that studies is one and the same thing. It is not to be wondered at, that very different and even opposite results have been attained by different methods of study and by starting out with different premises: at the present time the problem is being attacked along two different routes, one of which may be called the objective or physiological method and the other the subjective or direct method.

THE PHYSIOLOGICAL METHOD treats the phenomena of mind as manifestations of changes occurring in the brain. Under this conception thought is the product of the brain and is

*Thomas Aquinas, "the Angelical Doctor," defines Metaphysics as the science of "being and its modifications. In itself each *ens* is *res* and *unum*: in distinction

from others it is *aliquid*; as in harmony with the knowing faculties it is *verum* and as harmonizing with the will it is *bonum*."

secreted by it, much as bile is secreted by the liver; right thinking is the product of healthy brain action; illogical thinking is the product of unhealthy brain action. Carried into the region of disease, mental troubles and insanity are due to an unhealthy condition of brain tissue, just as pneumonia is due to an unhealthy condition of lung tissue.

A baffling obstacle to the rapid development of this school of Psychology was the fact that the brains of many individuals known to have had illogical, erratic, perverted and insane minds, presented a perfectly normal anatomy. No regular anatomical changes could be demonstrated in the brains of the most erratic persons or of the insane. In the latter half of the nineteenth century a decided advance was made when Ferrier and others demonstrated by vivisection that certain areas in or on the cortex controlled certain movements of the body: this discovery was received with great enthusiasm and it was confidently predicted that the time would soon come when mental processes, both in health and disease, would be traced to definite alterations in the brain tissues. These happy expectations, however, were not realized: speech was traced to the third frontal convolution, sight to the cuneus, leg movements to the upper part of the fissure of Rolando, and the external orbital muscles to the gyrus; but no important light was thrown on Psychology and no great practical results were realized.

THE SUBJECTIVE OR DIRECT METHOD leaves anatomy out of the question; it is based upon the claim that the mind is best studied and best understood as an entity, a thing in itself and quite apart from any assumed changes in the tissues of the brain. Mental activities, emotions, thoughts and passions are the subject of study: in this conception anatomical terms, brain cells, convolutions, etc., have no place; it deals entirely in terms of consciousness.

It is important, at the start, that these distinctions should be borne in mind; for any mixing of terms, brain cells and ideas, for instance, would result only in confusion. A further distinction should be made between the facts of experi-

ence or phenomena, so largely used by the physiological method, and the concepts indispensable to the direct method. A change in the structure of the brain, for instance, is a fact of experience, the observation and recording of facts is a part of all scientific study. A concept, on the other hand, is an invention of the scientist designed to explain and systematize the facts of experience. The distinction which underlies these ideas is expressed by the terms "phenomenal" and "conceptual." They are of equal rank in importance.

For instance, two hundred parts of metallic mercury, when rubbed up with one hundred and twenty-seven parts of iodine, turn scarlet; this is a fact of experience or a phenomenon. That the change takes place by the juxtaposition of indivisible particles or atoms is a concept; it is a concept because an atom has never been seen or demonstrated to the senses. Yet Dalton's concept of the atomic theory is and has been of the utmost practical importance and usefulness continuously for over a hundred years. So useful and so universal is it, that the lay reader is apt to misunderstand its nature and to regard it as a demonstrated fact instead of an invention of the scientist.

The direct or subjective method has been actively cultivated in recent years, owing to the practical unproductiveness of the pure physiological method: it has already produced valuable results in the field of medicine. It furnishes a key to many morbid mental states, and is a means of therapeutics that has cured many heretofore incurable cases. The chief purpose of this paper is to explain some of the points of this very modern method of studying the mind of man.

Bearing the above distinction in mind we will now consider some of the concepts by which this modern method of Psychology endeavors to explain the operation of the human mind.

PSYCHOLOGICAL DETERMINISM. It is preliminary to this study to admit that nothing happens in the realm of mentality without adequate cause. There is no "chance," no caprice, no accidental happening in the world of mind any

more than there is in the world of matter. If the necessary antecedents are present, the result is bound to follow. Every thought, however trifling and irrelevant, that flits through the mind is the only thought that could occur at that time, the conditions being what they are. If I am asked to write down a number—any number—the number I write is not the one it is by chance: it could be no other number than the one it is. There is no accidental happening about it. It is determined absolutely by the mental state of the moment and its antecedents. Unless this is admitted as a preliminary axiom, no science of Psychology can exist and you are stopped at the threshold without entering.

DISSOCIATION. Long a familiar term in chemistry, this word has been adopted by psychologists to express a condition of mind. Here it means dissociation of consciousness.

If we observe the content of our mind at any given moment it would probably seem to be a continuous, smoothly flowing stream of thought, either proceeding toward some end, or occurring hap-hazard as affected by our surroundings. Upon deeper study, however, we should find it to consist of innumerable systems of ideas rather than an indivisible whole. We would find that while the integral parts of each system were closely and logically connected with the other, the system, as a whole, was only loosely or not at all connected with other systems. So far from being a uniform stream of thought proceeding towards some end, it consists of a number of more or less isolated mental processes each pursuing its own end and using its own knowledge for the purpose in view.

When our eyes are directed upon some particular object in a landscape we see that part in light and clearness, while all other parts fall into obscurity. When an electric search-light goes forth through the night it brings a certain small area into distinctness and light while all other parts of the scene lie invisible in darkness. So it is with our mind: the field of consciousness is directed to one system of ideas at a time and all the other systems in our mind lie in darkness and obscurity. This is the usual state of affairs, but it is

not infrequent for the field of consciousness to be occupied with two systems at the same time; when slight in degree this is normal. Suppose, for instance, a musician playing at a piano; if expert he may be able to read the notes and perform correctly with proper expression, and, at the same time, be thinking of an absent friend and planning a meeting. Suppose a milliner trimming a hat, she does it well in accordance with a model, and all the time her mind is filled with tender memories and images of her lover absent in the war. Each of these activities is wholly independent of the other and yet both may be carried on at the same time. Thus the wonted, daily work may occupy one portion of the mind, and a day dream or a revery another portion.

When present in greater degree this dissociation of consciousness becomes abnormal and explains many of the phenomena of hysteria, insanity and double consciousness. The automatic writing of hysteria, where the patient will converse on one subject and write answers to questions whispered in her ear upon another and entirely different subject, is so explained. In double personality one system of ideas is so completely dissociated from the person's ordinary life that he is unconscious of the latter. Many of the puzzling whims of insanity, entirely unrelated to the patient's environment, are due to a system of ideas so active and so isolated as to remove the patient from the realities of life. Somnambulism is another illustration of completely dissociated consciousness.

The inner ideas of a dissociated system are logically related to each other, but they have a very slight connection with other parts of the mind.

It is often said of a person that he is insane upon one subject only and that on all other subjects he is perfectly normal. In such cases there is a single system of irrational ideas, all logically connected with each other, but, as a whole, so out of harmony with the outside world that the individual is said to be insane. The dissociated, irrational system may be so flagrantly untrue that a child can see it, but nevertheless the patient cannot be shaken out of it by logic or demonstration. It seems to exist in a logic-tight compartment of his mind and

to be unassailable. The occupant of an asylum may believe himself to be omnipotent and the wealthiest man in the world; his obvious, and ever-present poverty does not have the slightest effect upon his belief. The omnipotent millionaire sees no incongruity in performing his menial task of cleaning the ward cuspidors nor in his begging the favor of a chew of tobacco. From this statement of dissociation it will be seen that there are various degrees of it, all the way from a day-dream which interferes very slightly with one's ordinary life, to complete double consciousness which entirely abolishes it.

COMPLEXES. When a dissociated system of ideas is animated by a strong affection, it is called a complex; it is a system of ideas, logically related to each other, though not necessarily in harmony with the rest of the mentality, and animated by a strong affection. In other words, it is a hobby. It is notorious that a hobby is a great enemy to good judgment; in fact, a hobby is the greatest enemy to logical thought in existence. Logical thought is dispassionate, it is founded on fact and reason; each step is a natural sequence of the preceding step, and the claims of the various possible conclusions are impartially considered. Such thinking is comparatively rare in life; the fact is, we think and act from our affections rather than from logical reasons, and it is the activity of a complex that makes impartial judgment well nigh impossible.

A hobby discolors and refracts the light of truth, it interprets and distorts the plainest facts and puts unfair construction upon them. The cherished belief of a man that he knows why he thinks and acts in a certain way is largely a delusion.

RATIONALISATIONS OR FALSE REASONS. Everyone likes to believe that his thoughts have a rational basis; it is incompatible with our ideals of rationality to act in any other way. Hence when a man has done something because he wanted to, he immediately proceeds to manufacture reasons for it and to persuade himself that they are the real reasons. Such adventitious props serve to maintain our complacency and to preserve our self-esteem. People of irreproachable honesty in their business relations will often cheat the government

or public corporations. If taxed with the incongruity of their conduct, they will immediately produce a prolific crop of lame justifications to excuse the lapse. These are called rationalisations and are recognized to be abundant in the minds of the insane as well as in the normal. They afford a pathway to the secret roots of the patient's life. It is obvious that the hidden springs of our affections are not easy to discover; as a rule we do not seek to find them out; we only hunt up rationalisations for the acts which they prompt. We smile when pleased; we scowl when angry, but never pause to ask why. We may look at women with a careless eye, but are interested, excited and embarrassed before the particular one we love.

William James says that the ordinary man will answer questions like these by saying: "Of course, I smile; of course, I scowl, and why should I not be embarrassed in the presence of that beautiful soul so palpably and so flagrantly made to be loved by me to all eternity." Referring to our ignorance of our affections, he says: "So, probably, does each animal feel about the instinctive love of its nature; to the broody hen the notion would seem monstrous that there should be a creature in the world to whom a nestful of eggs was not the utterly fascinating, lovely, precious and never-to-be-too-much-sat-upon object that it is to her."

In every mind complexes are at work concealing our real motives, making excuses for our acts, saving our self-love and fostering our complacency. More often than not we do not recognize the fact that we are the victims of our hobby or complex; often they are the most secret things of our lives. It should also be noted that complexes sometimes express themselves frankly and directly and sometimes by devious routes. This is according to whether they are to our credit or the reverse.

CONFLICT. It often happens that two complexes exist in the same mind, of so opposite and incompatible a nature that it is impossible for them to be active at the same time; or there may be a single powerful complex out of harmony with all the rest of the person's mind.

In such cases a conflict arises between the two. New-churchmen can identify this as the scientific view of temptation. Such a combat produces distress and inward pain; the man is torn between two conflicting lines of conduct, both of which appeal to him powerfully. During this internal struggle the mind is undecided and paralysis of action follows. This state of indecision cannot last long; one or the other of the complexes must come to the surface and be ultimated in an act.

This act and its quality, and the way it is decided upon, opens the door to many of the inner crypts of abnormal minds. The results that follow a conflict are various, depending upon the sanity or insanity of the individual, the intenseness of the conflict and the nature of the conflict itself.

The only rational solution of a difficulty of this kind is to consider carefully the right and wrong of the conflicting complexes; bringing them into clear view of the mind and choosing the right one. In other words, fight it out to a finish. This settles it forever and leaves the mind uninjured, or even strengthened for another combat; it is the eminently sane method. Unfortunately few people make this fight frankly and the results that follow are numerous and disastrous, leading to hysteria, or to one of the innumerable forms of insanity. We will speak only of Repression, Projection, and Conversion.

REPRESSION. The mind avoids the pain of internal conflict by repressing the unpleasant complex into some inner recess. An educated conscience or humiliation, or shame or mortified self-love are the factors that make the complex unpleasant. Repression is the key to many a phase of insanity. The complex lies in hidden crypts, there to fester and ferment until it breaks out in some disorder of body or mind. Involuntary, habitual gestures, called "tics," usually have this origin as do many puzzling pains, postures, numbness and fits of melancholy.

PROJECTION. The pain of conflict may be avoided by projecting the unpleasant complex onto the shoulders of another person. We see this in everyday life, if observant.

A boy beaten and abused by a larger boy upon whom he is physically unable to revenge himself, will often project his rage upon an innocent smaller boy, whose only qualification for the honor is that he is weak enough to make it safe. Another instance is when a man, having received some affront in public, goes home and abuses his wife and whips his children. A drunkard may try to escape his own sense of humiliation by complaining bitterly of the drunkenness of his perfectly sober wife. We have known a man subject to frequent sprees, complain of his wife's drinking, and blame on her all the evil results of his own lapses for two years. He then reformed and, at the same time, all complaint about his wife ceased. The very common "delusions of persecution" of the insane, found in all asylums, can often be explained by the phenomenon of "Projection."

CONVERSION. This is a mode of avoiding an unpleasant trait in one's character, of which the person is more or less conscious, by assuming its opposite. An exaggerated and boisterous manner of familiarity and carelessness is frequently the outside covering of a genuine shyness and diffidence. A secret, gnawing grief or shame is often the cause of an unnaturally cheerful and witty exterior. The man of jokes is often a sad man internally. A person affected with pulmonary consumption or other fatal disease is generally cheerful and oblivious of the all too plain end that is coming; even with one foot in the grave they blink the situation and continue to make plans for the future that is never to come.

By means of these Concepts, namely, Dissociation, Complexes, Conflict, Projection and Conversion (and others not mentioned here) the new Psychology is endeavoring to unravel the tangled skein of the human mind. They may not appeal to the reader as eminently convincing, but a little honest introspection will reveal some of the concepts in his own mind, or, if that prove too difficult, he may easily find them in the minds of his neighbors. He may also remember that imperfect as they are they have yielded some remarkable results in our understanding of the states of insane

minds and that a therapeutics based upon them has been a boon to many disordered and suffering people.

NOTE.—The works of Bernard Hart,, Freud, Brill and other writers in this department were freely drawn on in the complication of this article.

THE ANIMAL SPIRIT.

BY EMANUEL SWEDENBORG.

CHAPTER I.

THAT THE ANIMAL SPIRIT IS THAT MOST PURE HUMOR WHICH FLOWS THROUGH THE MEDULLARY FIBRES OF THE BRAIN AND THE NERVE FIBRES OF THE BODY.

1. This is also the general opinion of the learned,—an opinion which is confirmed by all the phenomena; nor is there any doubt as to the existence of the animal spirits, or as to their being conceived in the brain and sent down through the fibres of the brain and into the fibres of the body, and finally into the motor fibres of the muscles. For without the aid of the spirits, actions which shall correspond to the decisions of the soul could never be carried on, nor could sensations be conveyed to the soul; and, therefore, if their descent is impeded by compression, amputation, erosion, or obstruction, whether in the fount itself or the brain, or in the first streams, that is, in the medullary fibres, or in the nerves, the effect at once ceases. Moreover, seen through the microscope the fibres are round, hollow cylinders,—as though they were fabricated for some percurrent fluid. Add to this, that without a fluid in the fibres nothing in the animal kingdom would ever effectuate its origin, progress, order, law, form, life. But what the medullary fibre is, and what the nerve fibre, and how the latter is continued from the former, may be seen in the TRANSACTION ON FIBRES. Since then there can be no doubt but that a species of fluid or some purer essence, runs through the fibres, the question arises, How is it to be denominated. It is generally called Animal Spirit, and is likened to a most pure humor which is of such nature, fluidity and perfection as to be able to flash through invisible fibres of this kind, like blood through its vessels.

CHAPTER II.

THAT THE ANIMAL SPIRIT IS CONCEIVED AND PREPARED IN THE
CORTICAL GLAND, AND FLOWS OUT THEREFROM
INTO THE FIBRES.

2. From the very connection of causes, it follows as a consequence that the animal spirit can be conceived and excluded nowhere else than in the cortical gland itself; for this gland is the beginning and head of its fibre, and is a little brain; and so, if the fibre goes out from its gland, and the animal spirit belongs to the fibre, then, of necessity, the spring and womb of the spirits must be in the gland. The cortical gland therefore may deservedly be called the most perfect laboratory or chemical organ of its kingdom. Moreover, according to the description of this gland, it contains a minute cavity, or simple chamber or ventricle, and also a pure medullary and cortical substance, which renders it a most perfect exemplar of the larger brain. Therefore, there can be no hesitation in declaring that in this gland a spirit can be prepared; but in what way, and by what art, and what the nature of the spirit,—this is the labor and the toil of our exploration. The most learned anatomists and physicists assert the same thing; and, therefore, to the cortex of the brain, they ascribe the nature and fabric of a gland; for all animal humors are elaborated in glands, and the smaller and simpler the gland, the purer the humor,—a humor which ought to be called not simply humor, but the better and nobler essence of the humors of the body. It is therefore designated by a name peculiar to itself, that is, by the name *Animal Spirits*.

CHAPTER III.

THAT THE QUALITY OF THE ANIMAL SPIRIT MAY BE LEARNED
FROM THE QUALITY OF ITS FIBRE, THROUGH WHICH
IT RUNS; AND VICE VERSA.

3. In the whole animal kingdom there is such correspondence, that the quality of one thing can be known from another. Especially is this the case in regard to the fluids which

run through the fibres, vessels and ducts. For the fibre is formed for its fluid or spirit; the arterial and venous vessel for its fluid, that is, for the blood; and so also in respect to the other humors. Into this conformity they are inaugurated from first infancy. Thus they are so mutually accommodated to each other, namely, the contained fluid and the containing fibre or tunicle of fibre, that, together, they act as one cause and determination. I do not wish, however, to treat of what has already been treated of;* the description of the fibre certainly affords a plain clue to the possible character of the spirituous humor; but my present undertaking is to more deeply investigate its interior nature.

CHAPTER IV.

THAT THE ANIMAL SPIRIT IS AN ESSENCE MIDWAY BETWEEN SOUL AND BODY; CONSEQUENTLY THAT IT IS A MEDIATORY SUBSTANCE, TO THE END THAT THERE MAY BE A COMMUNICATION OF THEIR OPERATIONS.

4. This also completely coincides with the received opinion of the learned in respect to the essence of the animal spirits. In order that the soul may operate upon the body, there is need of a mediate or mediatory substance. That the first form should flow into the last immediately, when there are a number of intermediate forms, is contrary to nature and her order. The soul is the first, supreme, inmost, simplest, and most perfect essence and substance; while the body is the last, lowest, outmost, most highly compounded, and imperfect substance. In order therefore, that that which is first may operate upon that which is in the last place, an intermediate must be present which shall take its nature from both; or, in order that the most perfect may act into that which is imperfect, there must necessarily be an intercedent which shall take something from both the perfection of the one and the imperfection of the

*Namely in Transaction I of the ECONOMY OF THE ANIMAL KINGDOM; see that work, nos. 135, *seq.*

See also THE FIBRE, nos. 151-2, 194, 242, 257.

other. Of such a nature is the animal spirit; and, therefore, when this is lacking, the soul remains powerless to rule the body in conformity with its own operations. The same is also clearly evident from actual effects and phenomena, there being, in these matters, such a luxuriance of experimental demonstration as to burden us with its abundance. But in what manner the animal spirit acts as mediator between soul and body, cannot be explained to the ordinary understanding, unless we know what the soul is, and what the body. The soul has been described above,* and likewise the body; but to perceive the mediation between them, we ought to know what fluids and fibres they are which determine the form and structure of the body. The first, principal, and proper essence and substance of the kingdom is that which is called the soul or the substance of the soul; while the last is the red blood,—it being the blood vessels that construct the last form or the form of the body; for organic structures are raised up and fabricated solely from fibres and from blood vessels. Therefore the mediate essence between the soul and the red blood, is the animal spirit. By this alone can the soul act into the blood, that is, into its body which is determined by and constructed of fibres and blood vessels.

CHAPTER V.

THAT THE ANIMAL SPIRIT PARTAKES OF THE ESSENCE OF THE SOUL AND OF THE ESSENCE OF THE BODY; OR, THAT IT IS BOTH SPIRITUAL AND MATERIAL.

5. The essence which is midway, or mediatory between soul and body ought to take its nature from both. The soul

*By "above," when used in this sense, Swedenborg in his first drafts very frequently refers to some preceding work in the same series or manuscript (see *Generation*, Preface, p. 12.) The present work on the ANIMAL SPIRIT was intended to follow immediately after Transaction III of the ECONOMY OF THE ANIMAL KING-

DOM, *i. e.*, THE FIBRE (see *Fibre*, pref. p. 13, and nos. 298, 301), and it is to this work that "above" in the text seems usually to refer; though sometimes it seems also to refer to Transactions I and II of the ECONOMY. For the reference in the present case see 2 *E. A. K.* 208, *seq.*, and 283, *seq.*; and *The Fibre*, 317-8.

is spiritual while the body is material. Hence it follows that this animal humor is both spiritual and material; otherwise the spiritual could never operate upon the material or *vice versa*. But how natures so diverse can be united in one subject, remains to be shown. That they are united, is evident from the body, its viscera, and motory and sensory organs, all which, though material, are yet animated.

CHAPTER VI.

THAT THE ANIMAL SPIRIT IS IDENTICAL* WITH THAT WHICH IS CALLED THE PURER, MIDDLE, OR WHITE BLOOD.

6. From the divided, disintegrated, or resolved globule of the red blood, another kind of blood-globule emerges, which appears not as red but as white; and, in fact, according to the manifold and clear experience of Leeuwenhoek, from one globule of red blood come six smaller globules of a white blood or humor. Not only have these smaller globules been actually seen, but they have also been described as to the mode of their coherence, and the mode of their separation, and also as to the fact that they disintegrate into still smaller globules. Thus far has our sight penetrated at the present day, and with this witness we can no longer call their existence into question. The blood-stream or humor consisting of these pure globules, I call the white and middle blood, for it passes off immediately from the ruptured red globule. This humor or pellucid blood that thus passes off, must certainly spring from its own peculiar origin; for it is divisible and highly flexible, and, therefore, must needs consist of some pure essence.

7. That this blood is identical with the animal spirits, may be deduced from the fact that it flashes through the minutest capillary vessels; that it insinuates itself into the cortical glands, and is thus derived into the fibres, and so accomplishes its circle; that, moreover, in its nature, it is exceedingly soft and yielding, is divisible, and adaptable to every single fibre;

*NOTE BY THE AUTHOR. This must be changed, for the spirit is distinct from the purer blood.

and also that it is able to be midway between the soul and the red blood. The red blood, that is, each globule thereof, is as it were a storehouse and complex of all the parts antecedent to it in existence; and it derives its principal essence from the soul itself, being animated above all the other humors. If, then, the red blood derives its prior essence from this pellucid blood, the latter evidently derives its prior essence from the soul or first substance; for there must be within it, something higher, more excellent, prior, superior, more interior, simple and perfect. The actual phenomena of the case, when investigated all the way to their causes, that is to say, more deeply, are unanimous in confirmation of this.

CHAPTER VII.

SINCE THE ANIMAL SPIRIT IS CONCEIVED AND PREPARED IN THE CORTICAL GLANDS, IT FOLLOWS, THAT IN THOSE GLANDS THE SPIRITUAL AND THE MATERIAL COME TOGETHER BY INFLUX

8. That, from the marriage of soul and body, an offspring may be born which shall bear the nature of both parents, it is necessary that the one and the other come together by influx into that chemical organ where the spirit is prepared. From the form of that organic gland,—specifically described above,*—it is apparent that in it, there is a minute bed or ventricle; and that there is also a most pure medullary substance,—being a double substance, namely, vascular and fibrous; and, in addition, a simple cortical substance which is the origin and beginning of simple fibres. When these phenomena are compared with the brain itself, which is also a gland and a great chemical laboratory, they may, to some extent, throw light on the subject of the generation of the above mentioned spirits; at least, they may afford such confirmation, that, with the causes of the phenomena coinciding, they would seem to even persuade us.

*See 2 *E. A. K.* 69, *seq.*, particularly, nos. 124, 195.

CHAPTER VIII.

THAT THE SIMPLE FIBRE, ARISING FROM ITS SIMPLE CORTEX, POURS INTO THE MINUTE CAVITY OR CHAMBER OF ITS GLAND, A SUBSTANCE OF THE PUREST KIND, WHICH IS CONCEIVED AND BORN IN THAT SIMPLE CORTEX, I. E., THE SUBSTANCE OF THE SOUL. AND THAT THE VESSELS OF UTMOST FINENESS WHICH CONSTITUTE THE OTHER PART OF THAT SIMPLE OR VASCULAR MEDULLA, POUR ON A LYMPH OR SERUM OF THE PUREST NATURE WHEREIN ARE PURER CORPUSCLES OR PRIMORDIAL SULPHUREO-SALINE ELEMENTS; FROM WHICH MARRIAGE IS BORN THE ANIMAL SPIRIT.

9. To understand these points it is necessary that we make ourselves familiar with the fabric of the cortical gland. A description of that gland has been given above, where the reader will see it confirmed that the simple substance which is called the soul, is conceived and brought forth in an eminent way, in the simple cortex, and that simple fibres are the pathways of its determinations or the rays of its intellectual light.* If, then, this first substance is conceived in the simple cortex, it follows that it is carried according to its fibres, wherever the latter are determined. That a large part of the simple fibres terminates in the extremely minute cavity of the gland, is a conclusion to which we are induced both by analogy and by instituting a comparison with the brain. For the medullary fibres of the brain, which run from the cortical glands, end for the most part in the lateral ventricles, and there exhale and deposit their spirituous essence; while that part of the fibres which does not end in these ventricles, is carried towards the medulla oblongata to give initiaments to the nerves. A similar reasoning seems to hold in regard to the simple fibres in the cortical gland itself, that is, in this most minute brain; add to this, that the great gland is quite a mass in comparison with the fibre which it emits, so that the whole of the gland does not go forth. Now if a large part of the fibre

*See 2 E. A. K. 204, seq., 274, seq., 296, 311, seq.; *Fibre*, 280, seq., 291.

is terminated in this minute chamber of the gland, it follows that the substance which is born in the simple cortex, is also derived thither, and is all poured into this same chamber, except such part of it as goes off into the medullary fibre.

10. That the purest sulphureo-saline elements and principles of the serum are carried off into this same chamber through their own proper vessels, may in like manner be evident from analogy and from comparison with the great brain. The medullary substance of the brain is two-fold, namely, vascular and fibrillar. In the lateral ventricles, moreover, there are entire plexuses of vessels—called the choroid plexuses,—which are weavings and interlacements of innumerable arterioles. From these there is distilled into the ventricles an abundant supply of a serum which, when commingled with the spirituous essence of the fibres, so prepares the animal spirit as to enable it to pass over in suitable manner into the red blood. A similar method seems to obtain in the cortical gland; for the vascular substance which ramifies through the gland, is all terminated in the above mentioned cavity of the gland, since where the beginning of the fibres is, there also is the end of the arteries. Now if both the medullary substances,—the fibrillar and the vascular,—are terminated in the same ventricle, chamber or simple cavity of the gland; and if the fibrillar carries the purest animal essence or substance of the soul, while the vascular carries sulphureo-saline or ethereal principles or elements; it follows, that, when wedded together in this little cavity, they generate that most noble offspring which is called the animal spirit, and which partakes of the spiritual essence and at the same time of the material.

11. But the question is asked, Whence come those subtle vessels which are inwoven in the gland? According to the idea of the cortical gland outlined above, there flows into the body of the gland not only the arterial vessel with its purer blood, but also the tunicle of that little vessel with the little stamens of which it is woven. These stamens of the little vessel, when ramified throughout the gland, constitute the second or vascular substance of its medulla.

12. As concerns the origin of these vascular stamens, since

they flow into the gland, they cannot arise immediately from its simple fibres; but they accompany the arterial vessels, that is, the carotids, from the kingdom of the body; for the inmost tunic of the arteries, which is called the membranous and fibrous tunic, is what ultimately remains and enters the cortical gland. This inmost tunic of the arteries takes its origin from those fibres to which I give the name Corporeal Fibres. For, under the cuticle and epidermis, throughout the whole circuit of the body, are sown an infinitude of glands with little mouths and emissaries which exhale the most subtle effluvia of the body, and draw similar, but fresh, effluvia from the bosom of the atmospheres and ether; similar glandular congeries are found also in the stomach, the lungs and elsewhere. From these subcutaneous or miliary glands, as well as from the others, proceed minute ducts,—as it were, corporeal fibres or fibres emulous of vessels,*—which weave the inmost tunic of the arteries and are finally terminated in the cortical glands where they constitute its vascular substance. That such is the production of the stamens which are inserted in the gland, is confirmed by the Sanctorian perspiration; by morbid, pestilential, and poisonous contagions; by the outpouring of enticing and enlivening exhalations in the time of Spring; by the fact of life enduring for a long period without food and drink,—a life especially familiar to certain animals; by the infinitude of pulmonary pipes found in insects, which pervade all the points of their viscera, nerves, and vessels, even to the inmost parts of the brain and medulla spinalis; by the wonderful communication of the glands with the atmospheres, according to Hippocrates; and by the ocean of such effluvia floating about in the air and ether. From the genesis of these fibres or vas-

*By the term Fibres, taken alone, the author means those threads or stamens which have their origin in the cortical brain; therefore to the fibres, referred to in the present text, which originate in the body, he gives the name Corporeal Fibres to distinguish them from fibres

proper; and he calls them “emulous of vessels,” because, while they are really fibres which serve as the veins or return paths for the fibres of the brain, yet, like vessels, they spring from the body and convey nourishment to the brain. See FIBRE 170.

cular stamens it can be concluded that they carry no other fluid than such as is elementary or material, namely, that which they draw from the atmospheres and purest aliments. This fluid, therefore, when married to the purest essence in the pore or little cavity of the cortical gland, gives rise to that animal spirit whereof we treat.

13. That these vessels imbibe a purest serum of this nature and transfer it towards the cortex; and that this serum is impregnated with sulphureo-saline principles and elements; and also that these elements are of such form that they can be coapted with the pure essence,—these are points which I might confirm by an infinitude of experimental testimony, if it were proper to here treat of the forms of these parts. But this matter demands an entire sheet,—which indeed I have already filled; but I do not venture to exhibit it here, lest I run too far from my course.*

CHAPTER IX.

THAT THERE IS ALSO A PERRENIAL CIRCULATION OF ANIMAL SPIRITS FROM THE CORTICAL GLANDS, THROUGH THE MEDULLARY FIBRES OF THE BRAIN AND THE NERVE FIBRES OF THE BODY, INTO THE BLOOD VESSELS, AND FROM THE BLOOD VESSELS OR ARTERIES BACK AGAIN INTO THE CORTICAL GLANDS, AND SO AGAIN INTO THE FIBRES.

14. In addition to the above mentioned living spring of animal spirits, there is also a perennial circulation of these same spirits; this, the more learned not only have suspected, but by the aid of their microscopes, seem to themselves to have even detected. For the arterial vessel enters into the cortical

*By "an entire sheet" the author means a sheet of his manuscript, *i. e.*, two leaves or four pages. The statement that he had already filled such a sheet on the subject of the corporeal fibre, seems to refer to the work on the FIBRE, which was written shortly before

the present treatise. In this work, nos. 182-187,—which would about fill four pages of the author's manuscript,—we find a treatment of the corporeal fibre which exactly meets the expectations raised in the present text.

gland on the one side, and the medullary fibre passes out on the other; in the gland itself there is a cavity which, like a chamber of the heart, draws in the arriving blood and sends it out into the fibre as into its artery; thus there exists a perpetual circulation from the arterial vessels, through the mediating glands, into the fibres. It has also been observed that the red blood never approaches so near to the gland as to flow into it, but only the white blood, that is, the resolved red blood, which is the same as the animal spirit. The animation or alternate constriction and expansion of the glands is the means whereby this blood is attracted and expelled. Without this circulation, the fibrous system would never be filled with its due supply of spirits; for an immense supply is required every moment, in order that the sensory and motory organs, and the several viscera, may perform their offices obediently to the bid of the soul. The several animal functions cease almost instantly, and the machine itself labors and is given up to death as soon as this circulation is arrested, whether in the vessels, or in the fibres, or in the glands themselves. The purer blood, which accomplishes this circle, also supplies similar elements for the restoration of the animal spirit.

CHAPTER X.

THAT WITHOUT THE ANIMAL SPIRIT THE SOUL COULD NEVER
HAVE CONSTRUCTED THOSE ORGANIC FORMS OF THE
BODY WHICH ARE SIMPLER AND MEDIATE.

15. The simpler and mediate organic forms of the body are those which are initiated and constructed solely by the medullary fibre of the brain and the nerve fibre of the body. Such forms are the primitive cerebrum and cerebellum, also the medulla oblongata and spinalis with their delicate members and parts; the inchoaments of the viscera, such as the heart, and of the sensory and motory organs; in a word, every organic form whatsoever to which the compound fibre goes. In the primordial age of their formation, all these forms are built up of fibres alone and not of blood vessels,—as has been observed by Mal-

pighi and others. The simple fibre alone, without the compound fibre which it forms by circumvolution, produces nothing organic; and so likewise the soul without the animal spirit, produces nothing organic, except the simple cortex, which is the first of organic forms and the nearest to the soul. Thus whatever is organic, partakes of both the simple and the compound fibre, or of the spiritual and the material.

CHAPTER XI.

THAT WITHOUT THE ANIMAL SPIRIT, THE SOUL IS UNABLE TO PRODUCE EITHER THE HEART AND THE ARTERIAL AND VENOUS VESSELS, OR THE RED BLOOD, OR, CONSEQUENTLY, THE ULTIMATE ORGANIC FORM, THAT IS, THE BODY.

16. According to the propositions of the TRANSACTION ON THE FIBRE, it follows that there is nothing substantial in the whole body except the soul and its fibre, which is called the simple fibre.* The reason is, because simple fibres, by their determination, form the medullary and nerve fibre; this, the blood vessels; and these again, in conjunction with fibres, the glands, from which proceed ducts or emissaries, like new fibres or vessels. From these, then, that is to say, from fibres, vessels and ducts, is constructed the whole system or body. Consequently blood vessels cannot exist without compound fibres, and the latter cannot act as fibres without animal spirit. Thus when the soul sets out to inform or create its body, it behooves it to first produce an intermediate spirit. Moreover, without such spirit, the red blood itself has no existence, this spirit being the principal essence of the blood; for, according to our proposition, when the red blood globule is dissolved, it is resolved into a purer, middle, and white blood, that is, into this spirit.

*See the FIBRE, n. 314-6.

CHAPTER XII.

THAT WITHOUT THE ANIMAL SPIRIT, THE SOUL CAN DETERMINE
NOTHING INTO ACT, THAT IS, CAN PERFORM NO
ACTION WHATEVER BY THE BODY.

17. The action of the body depends on the nerve fibres and blood vessels which construct the motor fibres; for into every muscle there enters both fibre and blood vessel, that is, both animal spirit and red blood,—a fact confirmed by visual experience. That the spirit and the blood are the efficient cause of the action of the muscles, is apparent from cases of convulsion, tetanus and spasms; from paralytic, apoplectic and epileptic subjects; and also from the fact of the immediate cessation of the action of the muscle when the fibre has been cut asunder, compressed or obstructed. In order, therefore, that action may proceed from will, and the will which regards such action, from the decision of the mind, there must necessarily be both spirit and blood; for the spirit is the middle substance over which the soul has empire, while the blood is the ultimate substance which renders obedience. But as to the arrangement whereby the soul determines its will into act, we learn this from the anatomy of the brain; for it is effected by the constriction and expansion of the cortical glands, by which means the animal spirit is expressed into the fibres and finally into the motor fibres of the body, like the blood from the heart into the arteries; and the blood, ever reacting restores it; hence the action is reciprocated.

CHAPTER XIII.

THAT WITHOUT THE ANIMAL SPIRIT, THE SOUL IS UNABLE TO
SENSATE THE THINGS WHICH HAPPEN TO THE BODY.

18. The several organs of the senses are all furnished with their own nerves; that is to say, the eye with its optic nerves; the ear with its auditory nerves, or nerves of the seventh pair; the tongue with its gustatory nerves, or the fifth and ninth

pair; the nostrils with their olfactory nerves which lie on the anterior surface of the cerebrum like little breasts. When these nerves are cut, compressed, stopped up, or otherwise weakened, then at once the sense is deprived of its sharpness, in proportion to the degree of the injury. This is dictated by simple experience. But the nerves themselves consist of medullary fibres, that is, of fibres which arise from the cortical glands; consequently, without the fluid and spirit of those fibres there is no sensation; nor, in the absence of such an *internuncio*, are sensations able to ascend immediately to the soul.

CHAPTER XIV.

THAT ACTION AND SENSATION, NAY, AND ALSO IMAGINATION
AND THOUGHT, ARE SUCH AS IS THE ANIMAL SPIRIT
AND ITS CIRCULATION IN THE BODY.

19. This is a consequent of the preceding propositions. For if the soul cannot act by the body, or sensate by the organs, without the animal spirit, it follows that such is the action and such the sensation, as is the animal spirit which produces the action and sensation. This is also manifest in drunkards, and likewise in the insane, the foolish, etc., with whom, either the spirits are contaminated, or they circulate irregularly, or, too small or too large a supply of them flows into the sensory and motory organs. The speech, gait, and countenance of such persons, and even the organ of their sight, afford clear evidence of the state of their spirits as being so excited by vinous fumes and pricks, that from their irrelation, comes un-ordered action and speech. As to the part of our proposition which concerns the imagination (whose ideas are changes of the state of the cortical gland), and also the thought (whose rational ideas are similar changes of the state of the simple cortex), this will be seen in what follows.* Meanwhile, ac-

*The author clearly refers to some following treatise, and perhaps to the unfinished tract on SENSATION, which appears to have

been written immediately after the present work; cf. *Sensation*, iv, viii, xi.

cording to the nature of the imagination, such is the sensation and action; for these descend from the imagination as from their proximate cause.

CHAPTER XV.

THAT THE ANIMAL SPIRIT RENDERS US BOTH SPIRITUAL AND CORPOREAL

20. According to the definition of Animal Spirits, they partake both of the soul and of the body; and such as the spirit is, and its circulation, such also is the action, sensation, imagination and thought. Consequently, it is from the nature and quality of these spirits, that we derive the fact that we are spiritual, and that we are corporeal or material; for in proportion as there is more of the soul in them, in that same proportion we are the more spiritual; and *vice versa*. Hence, it is apparent, that those who live on coarse food and drink, and immerse their mind in earthly affairs, enjoy a spirit that is unclean and is impregnated with material forms; this is also confirmed by experience.

CHAPTER XVI.

IN OUR MICROCOSM, ALL THAT IS ABOVE THE ANIMAL SPIRIT, IS CALLED THE INTERNAL MAN; AND ALL THAT IS BELOW IT, IS CALLED THE EXTERNAL MAN.

21. Above the animal spirit is the soul; below it, is the red blood and those humors which are grosser than blood. The soul is spiritual, and its operation, in respect to its regarding the body, is celestial; while the blood, for the most part, is corporeal, since it abounds in saline elements; but in the spirit, are contained both, since the spirit approaches to the nature of the one and the other equally. What is superior is also more simple, prior, more perfect, and at the same time more internal; and what is inferior is more compound, posterior, more imperfect, and at the same time more external. Therefore, the

internal man is above this spirit, and is more perfect; and the external man is below it, or is more imperfect. But as to how this internal or spiritual operates into the external or corporeal, this will be set forth in an article on the commerce of soul and body.

CHAPTER XVII.

THAT THE ANIMAL SPIRIT OF ONE INDIVIDUAL IS NEVER ABSOLUTELY LIKE THE ANIMAL SPIRIT OF ANOTHER, BUT IS DIFFERENT IN ALL THE INDIVIDUAL SUBJECTS OF HUMAN SOCIETY, AND EVER DIFFERENT IN THE SAME SUBJECT.

22. Passing by the fact that in all human society the state of the soul of one individual is never absolutely like the state of the soul of another; and that the red blood of one is never absolutely like the red blood of another,—for on these grounds it follows, that no one's animal spirit can be absolutely like the animal spirit of another, since the animal spirit is the middle or mediatory essence, and into it, from above, flows the soul, and from below, the blood, as noted above; the mind (*animus*) itself, moreover, depends on the nature of the spirits, hence minds are as many as spirits,—passing this by, the truth of our proposition is evident from experience. In no two individuals is there ever given a like countenance, speech, action, etc.; on the contrary, they can be distinguished in infinite ways. And since these forms cannot be constructed without the aid of the spirits; and since they are constructed according to the quality, quantity and circulation of these spirits; it follows, that in no two individuals can there be given spirits that are absolutely like or equal. Moreover, the perfection of nature, the nature of nature, consists in the fact that there is never a single thing identical with another in respect to all its essentials and accidents. As regards the question of quality, the spirits are impregnated with a large number of sulphureo-saline elements, and with more in one individual than in another; nay, they are impregnated also with different species of

elements, which they draw from the bosom of the atmospheres and from the inner essence of foods; thus there are infinite causes of variation. In addition, the cortical gland, which is the organ that prepares the spirits, is also different in different subjects; it prepares the spirits differently in one individual than in another, admitting into them and commingling together, more of one nature than of another. The quantity also differs in each individual. For the spirit is elaborated and expended according to the need, use, and necessity of the body; and, therefore, in respect to quantity it is different in every single individual. And so, likewise, the circulation, which depends entirely on natural necessity and rational use. For the cortical gland is continually and variously expanding and constricting; consequently there is attracted from the vessels, and expelled through the fibres, as much spirit as the body, with its sensory and motory organs, requires. Thus, the state of the circulation varies every moment in every man. The same is fully confirmed by the affections and sicknesses of the animus and by the diseases of the body.

23. OBSERVE that the purer blood is one thing, and the animal spirit another. The purer blood is that which arises from the resolved red blood, but the latter consists of spirits with interpositions of volatile particles, and primordial saline and sulphureous elements.

[THE END.]

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NOTES BY THE EDITOR.

Together with this issue of the NEW PHILOSOPHY subscribers will receive title pages and index for volumes XIV-XVI and XVII-XIX. In future we hope to issue title pages and index for the three years, commencing with volumes XX-XXII (1917-1919).

THE RETURN KINGDOM OF THE DIVINE PROCEEDING.

Our readers have doubtless noticed the advertisement in our last issue, of the publication of Miss Beekman's RETURN KINGDOM OF THE DIVINE PROCEEDING. Very few works dealing with Swedenborg's philosophy have excited so much interest, or stimulated such active thought, as this, which is now reprinted from the pages of the NEW PHILOSOPHY. It contains the first detailed and serious effort ever made to demonstrate the unity between the works of Swedenborg's earlier years and those of Swedenborg the Revelator. Indeed, the remarkable collections and quotations from the philosophical and the theological works, respectively, and their juxtaposition and comparison, so clearly exhibiting harmony between them, is of itself a feature of inestimable value to the student.

The work presents many new conceptions, and also many profound developments of doctrine, which, in themselves, have been long familiar to students of Swedenborg's theology. We need not now dwell on these new advances in thought. All our readers know something of them, and, moreover, they have been the subject of much controversy. Whatever may be thought as to the merits of these new developments so eloquently set forth in the RETURN KINGDOM, there surely can be no doubt as to the interest they have

aroused, and the stimulation they have given to a renewed and deeper study of Swedenborg's entire philosophy. To that study this new volume contributes the fruits of a profound and thorough research into the whole field of Swedenborg's writings; with the result that many weighty and far reaching teachings are brought forward which have either been but little known, or, where known, have been viewed in a more or less disconnected series.

The great outstanding feature of this work is the same that has characterized the same author's companion volume, *THE KINGDOM OF THE DIVINE PRECEEDING*, namely, the endeavor to present Swedenborg the Philosopher and Swedenborg the Revelator as one and the same man, and his teachings as, together, making a complete and harmonious whole.

"Miss Beekman has made a name for herself, as a close student of Swedenborg's philosophical writings (says a writer in the *NEW CHURCH MAGAZINE*, when reviewing the companion volume above referred to). Her frequent references to both series of Swedenborg's writings, the philosophical and the theological, open up new vistas even to the student of Swedenborg, and stimulate him to further researches. And among the rest he will find that though he may have studied the *PRINCIPIA*, yet if he has neglected the little work *ON THE INFINITE*, published by Swedenborg simultaneously with the large work, he has failed to grasp thoroughly the Christian principles that governed Swedenborg even as a man of science and philosophy." (*N. C. Messenger*, May 1, 1912.)

Equally appreciative of this feature of Miss Beekman's work is the Editor of *NEW CHURCH LIFE*, even though at the time he took serious issue with some of the author's fundamental conceptions. Reviewing the first chapter of the *RETURN KINGDOM* as it appeared in the *NEW PHILOSOPHY*, the Editor says: "If the reader will patiently read and read again the weighty sentences, he will obtain not only an abundance of new and interior perceptions of wonderful truths on both natural and spiritual planes, but also, in time, a general light which will prove of inestimable value in comprehending the relation of

the Writings to the philosophical works of Swedenborg." (*N. C. Life*, July, 1912.)

For the reason given above, we do not comment on the intrinsic merits of this work, further than to state that its general subject is the human mind, its nature, place and formation; and that in this field it opens many new avenues of thought. But, and especially in view of the fact that the author, in 1915, renounced her faith in the New Church, and of the wide we deem it well to set forth before the members of the SWEDENBORG SCIENTIFIC ASSOCIATION, the circumstances attending the publication of the RETURN KINGDOM.

It should be noted that under the title "Physiological Lectures" the chapters of the present work were written about 1906, and since then have not been altered in any way except as to such changes as were made by the editor of the NEW PHILOSOPHY in preparing them for the press,—he having received, to this end, *carte blanche* from the author.

As the papers appeared in our journal they were reprinted in sixteen-page fascicles. Subsequently, when the present writer was conducting a public class with these papers as the subject, the fascicles were sold to subscribers, with the understanding that after the payment of \$1.00 subscribers would be entitled to return fascicles in good condition and to receive a bound volume when published.

When the printing of the chapters in the NEW PHILOSOPHY was finished, there were about 35 subscribers who, having returned their fascicles, were entitled to the published work. Accordingly the book was issued in due course. Owing to the number of subscribers,—of whom some did not continue their subscriptions, while others did not apply for bound volumes,—and owing to the sales that have subsequently been made, the work, not only has been published without expense to the ASSOCIATION, but has even contributed to our funds. This is the more gratifying in view of the large demands which will be made on the treasury by the forthcoming publication of Swedenborg's work on THE FIBRE.

A BROCHURE ON SWEDENBORG'S FLYING MACHINE.

We have received from Mr. ALFRED H. STROH, a brochure, entitled EMANUEL SWEDENBORG UND DAS FLUGEN-PROBLEM (Swedenborg and the Flying-problem), by COUNT CARL VON KLINCKOWSTROEM. It is reprinted from the pages of "Geschichtsblätter für Technik," where it appeared in nos. 7-9, 10-12, of the 1916 volume. The reprint is apparently a part of a larger volume, as it is paged from 207-228. The author commences with a discussion of Swedenborg's scientific studies, and an account of the recognition given by modern European scholars, especially the Swedish, to Swedenborg's eminent services in the field of cosmology and physiology. He concludes his essay with a German translation of Swedenborg's two papers—the one in MS. and the other printed in DÆDALUS HYPERBOREUS—containing his projects for a flying machine. This is the first German translation of this work and has been made direct from the original Swedish in the photolithographed MSS., and in the DÆDALUS HYPERBOREUS. The translator has, however, consulted the English translation made by H. L. and C. Th. Odhner and published under the editorship of PROFESSOR ACTON, by the SWEDENBORG SCIENTIFIC ASSOCIATION in 1910; and, incidentally, he endorses the suggestion made in the preface to this translation, that Swedenborg conceived the idea of a flying machine while in London in 1711 or 1712. He thinks Swedenborg was influenced by Robert Hooke, whose model of a flying machine, constructed in 1648, and whose active polemics on the possibility of aeronautics, must have been in men's memory for some time after his death in 1703. He is also of the opinion that Swedenborg must have read the writings of BISHOP WILKINS. Hooke had submitted his plans for a flying machine to the Bishop, who greatly excelled in all mechanical matters, and the latter devoted many chapters of his curious and interesting work on NATURAL MAGIC to the problem of flying.

It may interest the reader to learn that the Bishop held that bodies heavier than air can be made to fly, and that the strength of persons within the "flying chariot" will suffice for

its motion as soon as it is sufficiently elevated. He also held that the higher a body ascends in the air the less is it under the empire of gravitation; and that it would be possible to travel quickly to distant regions of the earth by the mere process of rising a little higher than do powerful birds, and then redescending on that part of the earth's surface which its revolution had brought under the flying chariot.

Count von Klinckowstroem concludes his brochure with a brief comment on what the different parts of Swedenborg's machine were intended to secure for it; and then remarks: "Swedenborg never seems to have thought of a practical testing out of his projects, and in this he contrasts with all other pioneers of the art of flying, who mostly did not trouble themselves with matters of theory. Practical results, as is known, came only in our time from circumstantial attempts and studies in gliding and flying."

The brochure contains five illustrations comprising a portrait of Swedenborg, a photographic reproduction of his MS. drawings of a flying machine, and two photographs of "a model of Swedenborg's flying machine." The model excites both curiosity and interest, but surprisingly enough, the text makes not the slightest reference to these last two photographs.

E. E. I.

In connection with MR. IUNGERICH's comments on the German translation of the *FLYING MACHINE*, we are reminded of the fact that some years ago, when the Wrights and Curtis were engaged in litigation in connection with patent rights in aeroplane construction, the lawyers representing the Curtis firm applied for a copy of the English translation of Swedenborg's work. The particular object they had in mind does not appear, but, presumably, it was the establishment of the priority of certain basic ideas in the construction of flying machines.

BOOKS RECEIVED.

A SUMMARY OF THE DOCTRINES OF THE NEW CHURCH, compiled by Mary Wells Clark, Chicago, 1917, pp. 400. \$1.00.

This work presents short extracts from Swedenborg's theological writings, arranged under a great variety of headings. A well classified index enables the reader to select according to his taste. The compilation of these passages has been a labor of love for Mrs. Clark during many years, and the results justify her ardent hope that the work will be of benefit to many who may wish to spend a few quiet moments in spiritual reflection, or to gather for the day's work some leading thought from the Writings of the New Church.

A CATECHISM ON THE TEN COMMANDMENTS AND THE LORD'S PRAYER; FOR THE YOUNG PEOPLE OF THE NEW CHURCH, by C. Th. Odhner, General Church of the New Jerusalem, Bryn Athyn, Pa. 1917. pp. 86. Cl. \$1.00. Paper, 50c. The title is sufficiently descriptive of the contents of the work, but the mode of treatment is novel and is characterized by that excellence of style to which we are accustomed in Mr. Odhner's writings. Instead of the usual question and answer style of catechisms, short numbered headings are given, which may be used as questions, and which are followed by simple but comprehensive statements of the internal sense of the various parts of the Commandments and the Lord's Prayer, supported by a passage from the Word,—these passages being selected with great judgment. The work also includes the original text of the Decalogue and the Lord's Prayer. It should be in every New Church home and will be of especial benefit to the teacher in a New Church school and to the isolated New Church family.

THE ORDER AND PLAN OF SWEDENBORG'S PHYSIOLOGICAL WORKS.*

BY ALFRED ACTON.

The work on *THE FIBRE* is undoubtedly a part of that series of "Physiological Transactions," volumes I. and II., of which were published by the author under the title, *ECONOMY OF THE ANIMAL KINGDOM*.

What appears to be the first draft of the commencement of this series is contained in codex 65 of the Swedenborg MSS.; indeed, in a subsequent and, as yet, unpublished manuscript on the Brain (Codex 58) the author specifically refers to this codex 65 as his "first projection" (*Photolithographed MSS.*, 62).

Codex 65 contains "Transactions" I., II. and III. Originally the manuscript consisted of 1,482 pages, but as now preserved it contains only 1,098 pages, nearly all the missing pages being from Transactions I. and II. The larger part of the manuscript is reproduced in Vol. IV. of the *PHOTOLITHOGRAPHED MSS.*, edited by DR. R. L. TAFEL. From its contents, which include several references to a proposed Transactions IV, it can be shown that the author's first plan for his series of Transactions was as follows:

- Trans. I. The Cortex, Medulla and Vessels of the Brain. Degrees as exhibited in the Cortical Gland.
- Trans. II. The Coverings of the Brain; its Animation, Determinations and Functions.
- Trans. III. Introduction on the Animal Spirit; to be followed by a detailed examination of the various members of the Cerebrum.

*The article under this title forms the largest part of the Preface to the forthcoming edition of *THE FIBRE* in English translation. It is published in the *NEW PHILOSOPHY* at the suggestion of some of the Directors

of our Association, who are of the opinion that the questions here discussed, and particularly that of the relation of the *ECONOMY OF THE ANIMAL KINGDOM* to the *ANIMAL KINGDOM*, will be of interest to a wide audience.

Trans. IV. The Composition of the Blood (4 *Photolith.*, 762, 793, 801); and, at the end, the Dependence of Muscular Action on the Animation of the Brain (*ibid.* 522).

PLAN OF THE "ECONOMY" SERIES.

This plan was, however, modified by the author when he commenced the publication of his *Physiological Transactions* under the title *ECONOMY OF THE ANIMAL KINGDOM*. The first volume of this work was published in 1740 as "Transaction I. On the Blood," etc., with a concluding chapter, entitled "Introduction to Rational Psychology." The second volume was published in 1741, as "Transaction II.," On the Motion of the Brain; the Cortex; and the Human Soul.

Comparison of these published Transactions with the Transactions of the first projection in codex 65 shows that the last chapter of Transaction I. of the *ECONOMY* (Introduction to Rational Psychology) covers much of the same ground as is covered in Transaction II. of codex 65; and that Transaction II. of the *ECONOMY* covers much of the ground covered in Transactions I. and II. of the same codex; indeed in several cases the same anatomical quotations are used. We are thus led to conclude with some degree of certainty, that Transactions I. and II. of codex 65 are a first draft or first projection of what was subsequently published as the Introduction to Rational Psychology, in Transaction I., and the whole of Transaction II. of the *ECONOMY OF THE ANIMAL KINGDOM*.

From various references made by the author in this latter work to Transactions which are to follow, it can be established that, at the time of its publication, his plan for the whole series of Transactions was as follows:—the references are to the *Economy*:

- Trans. I. The Blood and Blood Vessels. Introduction to Rational Psychology.
- Trans. II. The Motion of the Brain. The Cortex. The Human Soul.
- Trans. III. The Cortical and Medullary substance of the Brain (I, 147, 157; II, 146, 115, 117). The Construction of the Fibre (II, 122). The Animal Spirit and its

course through the Fibre (II, 127). The Arachnoidal Humors (II, 130).

Trans. IV-VI. The Brain (I, 157; II, 115, 130, 146, 305); the Birth of the Animal Spirit (II, 130).

Trans. VII. The Tongue, Trachea and Lungs (I, 50, 279).

Transactions on the Liver (I, 343). Generation, (II, 295). The Muscles (I, 129, 142, 557). Freewill (II, 261, 299). Souls of Men and Brutes (II, 259). Harmony (I, 155).

The guiding principle that appears to have ruled in the formulation of the above plan whereby the human soul was to be sought in the body, is, that the universals of the body were to be treated of first, and then its various parts were to be taken up and examined in detail.

The same principle of treatment is seen in the first projection contained in codex 65; but in the ECONOMY the application of this principle is changed, as may be seen from the following table:

CODEX 65.	THE ECONOMY.
1. The universals of the Brain, <i>i. e.</i> , its Degrees, Motion, Function; the Animal Spirit. (<i>Trans.</i> I. and II.)	1. The universals of the Body, <i>i. e.</i> , its Blood and Ves- sels; the Heart. Introduc- tion to Rational Psychol- ogy. (<i>Trans.</i> I.)
2. The Animal Spirit. The mem- bers of the Cerebrum. (<i>Trans.</i> III.)	2. The Universals of the Brain, <i>i. e.</i> , its motion and Cor- tex. The Soul. (<i>Trans.</i> II.)
3. The universals of the Body, <i>i. e.</i> , the Blood; the in- fluence of the Brain's Ani- mation on the Body. (<i>Trans.</i> IV.)	3. The universals of the influx of Brain into Body, <i>i. e.</i> , the Fibre and its Spirit. (<i>Trans.</i> III.)
4. <i>seq.</i> The various parts of the Body. (<i>Trans.</i> V. <i>seq.</i>)	4. The members of the Brain. (<i>Trans.</i> IV.-VI.)
	5. The parts of the Body. (<i>Trans.</i> VII. <i>seq.</i>)

From this Table it will be seen that the first plan, or that of codex 65, was so far modified in the ECONOMY that, instead of treating first of the brain and then of the body, the author planned to devote his first Parts or Transactions to the universals entering into the entire series of physiological

investigations, and then to take up the members of the brain and afterwards the members of the body.

THE PURPOSE OF THE "ECONOMY" SERIES.

In this plan we find Swedenborg's characteristic and eminently rational use of the two methods of investigation,—the analytical and the synthetic. It is true, as he frequently points out, that human beings of our age must first ascend by the analytical way,—the way of experimental facts analytically investigated,—before they are prepared to descend by the synthetic way,—the way pointed out by ascertained and established doctrines. But by this, Swedenborg clearly did not mean that it behooved him to lay before his reader every detail of the subject under investigation, and to derive no conclusions except as explicitly based on the exhaustive examination of these details. This is the method of the learned of to-day. But with Swedenborg the analytical method was used for the purpose of thereby arriving at those universal principles and doctrines, in the light of which alone can there be any comprehension of the multitudinous details of the brain and body, and of the many problems which they present for solution. The analytical method was to be used, not for the purpose of solving particular and subordinate problems, but for the purpose of arriving at universal doctrines; and the subjects of the first analytical investigation were to be, not any specific parts of the human brain or body, but that brain and body considered as a whole. Thus the searcher after truth can receive those universal doctrines which are the principles of Nature herself, and by the guiding thread whereof he can safely tread the labyrinthine paths of science, to behold at every step the Wisdom of the Creator.

There is abundant evidence that, before SWEDENBORG published the *ECONOMY*, he had made the most thorough investigation into the anatomy of the brain and body; and that he had added to his knowledge by himself entering upon the work of dissection (*E. A. K.* 401, 403, 485). For the purpose of investigating the human soul (he says) "I have diligently examined the anatomy of the body, and especially

the human body with unwearying labors and intense study; and I have examined its several parts with the same industry as I have here employed on the cortical substance" (2 *E. A. K.* 214). But all this industry was expended with the single purpose of seeking out those universal laws from which Nature acts, and in the light of which, when once discovered, the search into the parts of the human body can be taken up anew as a means for the discovery of the soul in the temple wherein she dwells.

It was in accordance with this plan that SWEDENBORG commenced the publication of his series of physiological works. In the early works of the series the reader was first to be led by the analytical method to a comprehension of certain universals in the human body before being invited to the study of its particular members and viscera. Hence the *ECONOMY* commences with the blood,—the corporeal soul and universal essence of its body. Then follows the doctrine of Order, Series and Degrees, laid down in the Introduction to Rational Psychology. After this comes Transaction II. on the Cortex of the Brain, and its Motion,—these being the great universals which must rule in every study of the brain. Next was to follow Transaction III. on the Fibre and Animal Spirit,—these being the universal means whereby the soul and mind manifest their presence and operation in the body. After these universal studies the series was to be continued by special Transactions on the Brain, the Abdominal and thoracic viscera, the Organs of Generation, and, finally, the Soul.

After publishing the second of these Transactions in 1741, Swedenborg published no further work until 1744 when his *ANIMAL KINGDOM* appeared, wherein he appears to lay down an entirely new plan for his physiological series. The new series was to consist of seventeen "Parts," which, commencing with the viscera of the body, were to take up in succession the heart and blood, the organs of generation and of the five senses, the brain and its diseases, the doctrines of form, order, correspondence, etc., and, finally, the human animus, mind and soul.

THE "ECONOMY" AND THE "ANIMAL KINGDOM."

It has been supposed that in commencing this new series Swedenborg discards his former plan, begun in the *ECONOMY*, as unsatisfactory. But this conclusion is not warranted by the facts. It is true that, in this new series, SWEDENBORG somewhat changed or modified the order in which his studies were to be laid before the public; but there was no essential change. The *ANIMAL KINGDOM* is, in fact, a continuation of the *ECONOMY*, and this along the same general lines. The published Transactions of the latter work had prepared the ground, by laying down, on an analytical foundation, certain universal principles. This being accomplished, the next step was the examination of the various parts of the body and brain; then the gathering together in orderly presentation of the new doctrines discovered; and, finally, the revelation, the unveiling, of the soul. This intimate connection between the *ECONOMY* and the *ANIMAL KINGDOM* is involved in the following statement in the latter work:

"Not very long ago I committed to the public press the *ECONOMY OF THE ANIMAL KINGDOM*,—a work which was divided into Transactions,—but only the Transactions on the Blood, its Arteries and Heart, and on the Motion and Cortex of the brain; and, before the several stages of the journey had been run, I made a rapid passage to the soul. But on deeper reflection I found that I had taken my steps more hastily and quickly than was due, that is to say, merely on the basis of an investigation of the blood and its proper organs,—which was done because I was impelled by the ardor of learning. But since the soul acts in supremes and inmosts, and does not come to view until all her swathings have been unwrapped in order, therefore I have determined to allow myself no rest until I have run through the whole field even to the goal." (*A. K.* 19.)

The passage to the soul had been "too hasty;" and yet in this passage,—we refer to the last chapter of Transaction II. of the *ECONOMY*,—Swedenborg lays down the great universal doctrines concerning the human soul to which he constantly refers in his later works belonging to the *Animal Kingdom* series, and from which he never in the least deviates. And yet the passage had been "too hasty." It is not enough to view

the soul merely on the basis of the universals of the body and brain; but, having thus been given a view of the soul in her universal operations, it is now necessary that we descend again to the body and traverse the whole field of anatomy in order that the soul may be fully revealed to our reverent and newly awakened gaze. This, indeed, had been the plan of the *ECONOMY*; but the plan had not been publicly set forth, and the work remained apparently unfinished and abandoned,—as a too hasty passage to the soul. Its use, however, had been served,—it had furnished the light to guide the steps in the “several stages” of the long journey that had yet to be run.

As contemplated in the published Transactions of the *ECONOMY*, the three Transactions on universals,—the Blood, the Brain, and the Fibre,—were to be followed by detailed studies of particular parts of the body. First was to be taken up the members of the brain, then the viscera of the abdomen and thorax, the organs of generation, etc. In the Animal Kingdom series the order in pursuing this detailed investigation is changed, but the characteristic quality of the studies to be now commenced, remains the same; that is to say, the series initiated by the first Transactions of the *ECONOMY* is now to continue with the analytical investigation of the parts of the human body.

And here we see the reason for the change in title from the “Economy of the Animal Kingdom, considered anatomically, physically and philosophically” to “The Animal Kingdom considered anatomically, physically and philosophically.” The former work, dealing with the universals of the body—the blood and cortex, together with the doctrine of degrees, and a universal view of the soul—is called *THE ECONOMY* (*i. e.*, the government) *OF THE ANIMAL KINGDOM*. But the latter, wherein Swedenborg, from the light of these universals, enters upon the particular study of the parts of brain and body, receives a new name, *THE ANIMAL KINGDOM*. In both series the subject is “considered anatomically, physically and philosophically.”

From a passage in the *ECONOMY*, it might appear that SWE-

DENBORG intended to incorporate some part of his *ECONOMY* into the *ANIMAL KINGDOM*; for, in the latter work, speaking of the analysis of the blood, he says: "I have, indeed, made this analysis in the *ECONOMY OF THE ANIMAL KINGDOM*, but it must be inserted in the present work in its proper place" *i. e.*, as Part III. (*A. K.* 217d). Other references, however, show that the Part III. of the *ANIMAL KINGDOM* on the Heart and blood, was to be quite distinct from the former treatise; for very frequently reference is made to the treatment of the blood in the *ECONOMY*, and, *at the same time*, to Part III., where the subject of the blood will be further treated of (124a, 258i). Hence the "it" in the quotation just made, refers, not to the *ECONOMY*, but to another "analysis of the blood."

But when Part III. became due in the series it was omitted, the omission being explained by the author in the following words which are written at the commencement of Part III., as published, but which, according to the original plan, was to have been Part VI.:

In the index of the series of the whole work the promise was given that we would next (*i. e.*, after Part II.) treat of the Heart, its arteries, veins and blood; and also of the Members of Generation. . . . But the heart and its vessels and blood has already been treated of in our *ECONOMY OF THE ANIMAL KINGDOM*. As to the members of generation, they must be treated of after we have learned what the animal spirit is and what the soul, for it is by these organs that the soul comes off from itself into the offspring. It would therefore be premature, and so I myself would be unequal to the task, to deliver anything concerning these members as instrumental causes, without a knowledge of the principal cause. I have therefore considered that we must first ascend by degrees to the supreme sphere, from whence we may legitimately deduce the principles of things, and where we may speak of the soul with greater certainty and definiteness." (*A. K.* 407.)

The reason here given for omitting Part III. on the Heart, is that it has already been treated of in a former work; but elsewhere our author plainly intimates that this Part is omitted also for the same reason as that given for the omission of the Part on Generation, namely, that further univer-

sals must be learned before the enquiry can be further prosecuted. The passage to which we refer occurs in the first draft of Part VI. of the ANIMAL KINGDOM, On the Senses, and reads as follows:

We have promised we would next treat of the heart, arteries, and blood; and then of the members of generation; but, further than what has been said of the heart, arteries and blood in the work which I have called *ECONOMY OF THE ANIMAL KINGDOM*,—the matter being more deeply reflected on,—it is not allowed to advance our steps immediately and next in order. For we learn what the blood is from all things of the body. All the nooks and crannies through which it runs must first be investigated, namely, the viscera of the abdomen and thorax, and especially the brain. (*Senses* 6.)

It is clear, therefore, that when SWEDENBORG was publishing the ANIMAL KINGDOM it was his intention to supplement Transaction I. of the *Economy* by another treatise on the blood, which should constitute Part III. of the ANIMAL KINGDOM; but that when he had finished Part II. he concluded to rest content with the presentation of the blood and the heart as given in the *ECONOMY*, reserving to himself the right of going more fully into these studies in the light of his further investigations into the human body.

But, in any case, his general plan stands forth clearly, that universals must first be treated of: First, The Blood, and the doctrine of *Séries* and Degrees. Second, The Cortex and Its Motion; the spirituous Fluid and the Soul. Third, The Fibre and Animal Spirit, as the connecting link between brain and body; and the Doctrine of Forms as the key to the laws of ascent and descent. It was after these had been presented that SWEDENBORG proposed to enter upon the particular investigation of the body and brain. The plan is the same in both the *ECONOMY* (as projected) and the ANIMAL KINGDOM; it was only the method of carrying it out that was modified. This may be seen from the following table setting forth the two series:

ECONOMY SERIES.	ANIMAL KINGDOM SERIES.
1. The three universals. (<i>Trans.</i> I.-III.)	1. The two universals as given in the published <i>ECONOMY</i> .

- | | |
|--|--|
| 2. The brain. (<i>Tr.</i> IV.-VI.) | 2. The body, beginning with the mouth and tongue, and including the organs of generation and sensation. (Parts I.-VI.) |
| 3. The body, beginning with the mouth and tongue; generation, etc. (<i>Tr.</i> VII. <i>seq.</i>) | 3. The brain and the fibre. (Parts VII.-XI.) |
| 4. The soul. | 4. The soul. (Parts XII.-XVII.) |

CONTINUATIONS OF THE "ECONOMY."

Only two of the proposed three universals are dealt with in the published Transactions of the ECONOMY. But it is clear that the author had the distinct intention of following these published Transactions by a third to treat of the Fibre. This is shown by the numerous references (noted above) in the ECONOMY itself to a proposed Transaction III on the Fibre and Animal Spirit; and it is rendered doubly certain by an advertisement contained in the second edition of the ECONOMY published by the author in 1742. With the exception of the title page and this advertisement, this second edition is word for word the same as the first, and it is quite evidently merely a re-issue of the printed sheets of the first edition with a new title page and a page of advertisement, and another of *Emendanda*.

The advertisement is entitled "Catalogue of books published and to be published." After enumerating the PRINCIPIA and other works already published, the Catalogue continues:

FOUR BOOKS SOON TO BE PUBLISHED.

1. The Medullary Fibre of the Brain and the Nerve Fibre of the Body.
2. The Animal Spirit.
3. Concordance of Systems on the Human Soul and its intercourse with the Body.
4. Divine Prudence, Predestination, Fate, Fortune and Human Prudence.

The announcement that these works are "soon to be published" justifies us in concluding that at this time, 1742, they

were well in hand; otherwise the list might have been much extended, since the published Transactions of the ECONOMY mention many other works as a continuation of the series there commenced. But, in addition, the conclusion is supported by direct evidence, in that, among the author's MSS., are found two of the above works both of which are in form prepared for the press. The one is the present work on the FIBRE, and the other is the work on the HUMAN SOUL.

The manuscript on the SOUL is contained in codex 74, being the last of the seven works contained in that manuscript, as noted above at the commencement of this Preface. It did not, however, form a part of this codex at the time it was written, for its pages are of a different size than the pages of the rest of the codex. Originally it appears to have been a not inconsiderable work; but, at least, one-half of the original manuscript is lost. As now preserved it reaches to page 80, though of these 80 pages two are blank and 34 are missing. Moreover, the manuscript ends in the middle of a sentence, and an examination of its contents and their scope makes it clear that there were a large number of pages following page 80. That this work is the one referred to in the above list as "3. Concordance of Systems," etc., is indicated by its contents; for it at once enters into a discussion of the various systems that have been propounded respecting the harmony of soul and body. And that it was prepared for the press, is clear from its finished style and from the circumstance that it is preceded by a Preface to the reader. In this connection, it is also worthy of note that in this Preface the author explains that instead of following his original intention "to comprise in a single volume" his "long meditations on the soul and body," he had "thought it most prudent to divide the labor" and to issue five or six publications a year under the general heading "Psychological Transactions" (*Opus. Phil.*, p. 91-2). From which it would appear that it had been SWEDENBORG'S intention to write further on the soul before commencing the particular transactions on the brain and body, which were originally to follow the transaction on the Fibre.

The author has also left a manuscript on the Animal Spirit. It comprises 24 pages and is bound in with the FIBRE in codex 74, though, as we have already noted, it was not originally a part of this codex. Whether it is the work referred to in the List of books to be published is not certain; its style, however, clearly indicates that it is not prepared for the press.

Number 4, of the List, the work on Divine Prudence, etc., is lost without any trace as to its whereabouts. That SWEDENBORG actually wrote the work is, however, explicitly stated by the author himself in his posthumous work on THE SOUL (n. 56). Possibly it formed a part of the manuscript containing the work on the Concordance of Systems on the Human Soul, and was lost, together with the latter part of that work.

THE FIBRE.

We turn now to the first work in the list of books to be published, namely, THE FIBRE. This is the work which is now presented to the reader. It forms by far the largest part of codex 74, as we have already noted. Its finished style and careful arrangement clearly indicate that it was prepared for the press, and there can be no doubt but that it is the work referred to in 1742 as "soon to be published." Consequently it was written between 1741, the date of the first edition of the ECONOMY, and 1742, the date of the second edition containing the advertisement of its publication in the near future. We may, therefore, fix the time of its composition, or, at any rate, of its preparation for the press, as the latter part of 1741 or the beginning of 1742.

The evidence which we have advanced makes it indubitable that this work on the fibre is the Transaction III. on the Fibre so often referred to in the ECONOMY, and that it is also the work on "The Medullary Fibre of the Brain and the Nerve Fibre of the Body" advertised in 1742 as soon to be published. We have therefore felt justified in publishing it under the latter title and as Transaction III. of the ECONOMY OF THE ANIMAL KINGDOM. The manuscript itself contains only the titles, "The Fibre," "The Arachnoid Tunic," and

"Diseases of the Fibre,"—titles which are entered only at the head of the several parts of the work where these subjects are taken up.

The general plan of the published transactions of the *ECONOMY* was, First, the presentation of "Anatomical Experience," and, second, an "Induction," first presented as a whole, and then taken up, part by part, and commented on at length in separate paragraphs. That this was the plan also of the present work,—or, at any rate, that the author commenced the work on this plan, is clear; for many of the paragraphs are comments on parts of the induction, which, by themselves, do not form a complete sentence; see, for example, nos. 19, 82, 135, 176. But in this manuscript the author has not gathered up the separate parts of his induction into a single and introductory presentation, as in the case of the published transactions, though it is not improbable that he intended to do this when seeing the work through the press. So far as the first nine chapters are concerned this intention seems clearly indicated; and therefore in our translation we have introduced each of these chapters by an added paragraph wherein we present, as a whole, the various parts of the induction treated of in the chapter. After chapter IX, however, this became impracticable. The style of the work there begins to change; the underscored or italic portions indicating the inductions become longer and the comment shorter, until finally the paragraphs consist almost entirely of underscored lines. There is no change in the style of diction, which is maintained at a high standard throughout the work. The change is solely in the plan of treatment. In the beginning this is the same as in the *ECONOMY*, but later the work becomes a simple treatise with little or no distinction between induction and comment,—a mark perhaps of an intermediate stage between the plan of the *ECONOMY* and that of the *ANIMAL KINGDOM*, where the induction, or Analysis, as it is there called, forms the text and the comment is put in the shape of foot-notes.

The author has included as a part of his work on *THE*

FIBRE a treatise on the ARACHNOID TUNIC,—and this because the arachnoid is the administrator of the juices around fibres and fascicles whereby these are preserved in their distinctions and uses. He has also included a treatise on DISEASES OF THE FIBRE, as showing the effects in brain and body of disorders in the fibres; for thus their functions are seen the more clearly.

It is needless to dwell upon the merits of the work here presented. The work itself is now before the reader. *Ipsè judicet*. But we may be allowed to here place before a wider audience the brief but eloquent testimony penned by the editor of the Latin edition more than seventy years ago.

“The literary style of this work (says Dr. Wilkinson) is concise and polished. Its order is everywhere vigorous,—after the image of the order of Nature herself whose servant and interpreter, nay, whose high priest, SWEDENBORG must in all justice be called. For his keen sighted induction penetrates into the hidden recesses of the animal body and of the entire world; to each part does he attribute its proper provinces and functions; he illumines them all with analytical and rational light; he fosters them with truly human heat, which is love; and, to an awakened thought and a new-born reverence, he presents the entire organism as a work worthy of the Supreme Deity. He again joins soul to body. He grants and restores the empire of the superior over things inferior, of the spiritual over things natural. And so, our organic body, long the subject of bare anatomy, is presented to us men, and, above all, to our mind, as animated anew. Thus haply we rise from the tomb and corpses of dead sciences to the living and gladsome lights of divine philosophy; and, with sure faith firmly established, we wait with joy for more enlightened times. To God be the glory.”

SENSATION OR THE PASSION OF THE BODY.

BY EMANUEL SWEDENBORG.

CHAPTER I.

THAT SENSATIONS ARE EXTERNAL AND INTERNAL.

The external senses are touch, taste, smell, hearing and sight; these are also called the bodily senses. Internal sensation is spoken of as the perception or apperception of the things that flow in from the organs of the external senses. Inmost sensation is intellection; for the things which are sensated and perceived must also be rationally understood. But the inmost of all, or the principle of sensations, belongs to the soul, and is called pure intellection or intelligence; for our ability to sensate, perceive, understand, belongs to the soul alone. Just as sensations are external and internal, so also are the organs of sensations. The organ of touch is the external surface of the whole body; the organ of taste is the tongue; [the organ] of smell is the membrane of the nostrils and their cavities; the organ of hearing is the ear, and of sight the eye. The organ of perception is the cortical cerebrum, or the cortical substance of the cerebrum. The organ of intellection or of inmost sensation, is the purest cortex, or that simple cortex which is contained in each cortical gland. These organs, both the internal and the external, are called sensories, the cerebrum being the common sensory of all the external sensories.

CHAPTER II.

THAT EXTERNAL SENSATIONS COMMUNICATE WITH INTERNAL SENSATIONS, OR THE EXTERNAL SENSORIES WITH THE INTERNAL SENSORIES, AND WITH THE INMOST, BY MEANS OF FIBRES.

Everyone who is imbued with the first rudiments of anatomy, knows that external sensations communicate with internal by means of fibres. For from every point of the cuticle, there

issues a fibre which runs towards the medulla spinalis or oblongata,—this being the reason why such fibres are called sensory, and are distinguished from motory fibres; from every point of the tongue, a fibre of the ninth, eighth, and fifth pair of the head; from the nostrils, fibres run through the cribriform plate into the mamillary processes which are affixed to the anterior surface of the cerebrum like two bottles; from the ear a fibre of the seventh pair, both hard and soft; and from the eye proceeds the great optic nerve. These fibres run on, until they reach their beginnings, that is, the cortical glands. In these beginnings or glands resides the whole of the internal sense, which depends on their change of state. From this gland again, are extended simple fibres reaching to a purer cortex, which we call the simple cortex, whence comes the intellection of the things apperceived and sensated. Thus, by means of fibres, there is a continual communication of external and internal sensations. This also is the reason why a sense straightway languishes or dies away, as soon as the intermediary nerve is cut, torn apart, or obstructed,—as is clearly apparent from the innumerable effects of diseases.

CHAPTER III.

THAT NO SENSATION IS POSSIBLE WITHOUT A SUITABLE ORGANIC SUBSTANCE.

Sight can by no means exist without the eye, hearing without the ear, taste without the tongue, smell without the pituitary membrane. And in like manner, as the external senses cannot exist without a suitable organic substance, that is, without organs, so neither can the internal senses. The organic substance of perception is the cortical gland, and that of intellection is the simple cortex,—as pointed out above. It is altogether repugnant to nature that anything sensitive and intellectual can have existence apart from a suitable substance; for sensations are only forces and modifications going forth from substances which are acted upon. For this reason, the soul is the only sentient and intelligent substance in its body.

CHAPTER IV.

THAT THE SENSATION IS SUCH AS THE ORGANIC SUBSTANCE IS ;
AND THE ORGANIC SUBSTANCE, SUCH AS THE SENSATION.

That is to say, as the hearing is, such is the ear ; and as the sight, such the eye ; and also the reverse, namely, as the ear is, such is the hearing, and as the eye, such the sight. So also in the other senses. Thus, in the interior senses, as perception and imagination are, such is the cortical gland, which may be termed the internal eyelet or eye ; and, as the intellection is, such is the simple cortex ; and the reverse. Therefore every sensation conforms itself to the state of its sensory. For if sensation is a sensation of its organ, necessity requires that it be according to the state of its organ.

CHAPTER V.

THAT THE EXTERNAL SENSATION IS ACCORDING TO THE NATURE
OF ITS COMMUNICATION WITH THE INTERNAL SENSORIUM.

It is not the organ of external sensation that sensates, but only the soul, since the soul understands the nature of the sensation. Consequently the organ of the external sense is nothing more than an instrument receiving the first impulses and contacts, that is, the forces that come to it. Therefore, when the eye is closed and the ear reposes, as during sleep, we still seem to see and hear ; and when, in the brain, the faculty of perception is lost, the external organs are straightway deprived of their sensation,—though not the reverse. From this cause it is, that our sensations become either dull or acute, or obscure, or distinct. That the sense itself varies, according to the changed state of the brain, is apparent from the diseases of the head. For the fibre is either relaxed, as in sleep ; or is tensed and elevated and rendered distinct for the reception of the sensation, as in wakefulness ; or it is inflamed and heated, or affected in other ways ; and straightway, in accordance with the state thus induced on the fibres, or into which the fibres are reduced, so the sense itself varies.

CHAPTER VI.

AS THE FORM OF THE ORGAN IS, SUCH IS THE FORM OF THE SENSATION.

If the organ be a substance, and the sensation a modification, and if no sensation is possible without an organic form, it follows that the substantial form, or that of the sensory, must coincide with the form of the modification, or that of the sensation. Form can be predicated, both of substance, and of forces and modifications. For form is constituted of essential determinations,—which determinations cannot be conceived of without an idea of the coexistence or fluxion of individuals; if these latter are actuated, there results a form of modification which must needs be like the form of the substances which are in determinate fluxion. Therefore, as the form of the eye is, such is the sight; as the form of the ear, such is the hearing; and also, as the form of the cortical gland, such is the perception and imagination; and so forth. Thus, when the organ is changed, the sense which results therefrom, is changed conformably. But as to the nature of the form of each organ and of the sensation resulting therefrom, to enquire into this is too long an undertaking. The form of the eye and of sight is more perfect than the form of the ear and of hearing; while the form of the cortical gland or of the internal sight is more perfect than the form of the eye or of the external sight. Thus perfections of organic forms increase and are elevated by degrees even to the soul itself, which is the form of forms of its body, or the informer of them all. These more perfect forms are also called superior, prior, simpler and more internal.

CHAPTER VII.

THAT INTERNAL SENSATION CAN EXIST AND LIVE WITHOUT EXTERNAL SENSATION, BUT NOT THE REVERSE.

When the brain is uninjured, internal sensation, that is to say, perception and intellection, or imagination and thought, continues in its vigor, howsoever the organs of the external senses may labor under sickness; those who are deaf and

blind are still able to reason and think. But as soon as the common sensory, or the brain labors, the external organs are deprived of their faculty of sensating. Therefore, the latter depends on the former, but not the reverse. Hence it follows:

CHAPTER VIII.

THAT IT IS THE SOUL ALONE WHICH SENSATES, PERCEIVES,
UNDERSTANDS.

The soul is the pure intelligence, and the life of our body; to which, as to their centre, are referred all the things carried on in the peripheries; but organic substances or sensations are subordinated to it. The first sensation after the soul, is intellection or rational understanding, which is a mixed intelligence; under this comes perception; to this, are subjected the five powers of sensation enumerated above, namely, sight, hearing, taste, smell, and touch, which are the outermost sensations and belong to the body; of these, however, one is nearer to the soul than another. Thus the soul is approached only by degrees,* or by a ladder, as it were. If any intermediate sensation is weakened or destroyed, the approach to the soul is, in like manner, impeded or broken,—the soul meanwhile, remaining in its own centre and intelligence without communication with the body. For example, hearing is not possible without a certain internal sight almost like that of the eye; nor is this possible without an inmost sight, that is, without thought; and this, since it is a mixed intelligence, is not possible without a pure intelligence; the existence of a mixed intelligence necessarily requires that there be, above it, a pure intelligence. The consequence is, that there can be no sensation without the soul, which is the only substance in the body that sensates, since it is the only substance that purely understands what is sensated.

*The Latin word for degree (*gradus*) means also the steps of a stairway or ladder.

CHAPTER IX.

THAT ALL SENSATION, BOTH EXTERNAL AND INTERNAL, IS PASSION ; CONSEQUENTLY THAT THE SOUL, WHEN IT SENSATES, IS PASSIVE.

For the eye to see, it is necessary that something flow into it, that can be apprehended by the sight, namely, the appearances, combined colorings, and modifications of shade and light, which are set before it. For the ear to hear, it is necessary that sound impinge upon the tympanum and fenestræ of the ear. For the tongue to taste, there must be sharp-pointed, saline, and other particles which shall strike the papillæ of the tongue ; and so, likewise, for the nostrils to smell. Therefore all sense is effected by touches. In the eye and ear, these are more subtle, being merely the touches of forces and their forms ; but in the tongue and nose, they are comparatively heavy and gross ; and in the skin, cuticles, and membranes, the sense whereof is called touch proper, they are heaviest of all. In this way, without touch, there exists no sensation, which latter is produced according to every form of touch or of tactile objects. Thus sensation is not an action, but a passion. Interior sensation, or first perception, is also a passion, but more perfect and pure ; for the internal sensory perceives only what comes to it from the external sensories, and the nature of its perception is according to the nature of the images and ideas that flow in. So likewise intellection or inmost sensation, which depends upon perception just as perception depends upon sensation. Thus the approach is made to the soul which alone sensates because it alone understands. Consequently, the soul, when it sensates, is passive ; which is the reason why it is delighted with things harmonious, and saddened by things inharmonious.

CHAPTER X.

THAT MODIFICATIONS OF THE AIR AND ETHER IN THE WORLD
 CORRESPOND TO HEARING AND SIGHT IN THE ANIMATE BODY ;
 AND THAT THESE MODIFICATIONS IMMEDIATELY LIVE,
 AS IT WERE, AND BECOME SENSATIONS, AS SOON AS
 THEY COME IN CONTACT WITH A SENSORY OR-
 GAN CONFORMABLE TO THEMSELVES.

As are the modifications of the air, such also are those of the ear, that is, melodies, sounds, harmonies ; and as are the modifications of the ether, such are the images of sight. Outside the animate body, modifications are inanimate and dead, but as soon as they come in contact with that body, they are transformed into sensations. This is the reason why sensations are generally called modifications, and why the organs are said to be modified ; for at their first approach, contact or afflatus, these modifications partake of the life of the soul which sensates the nature of the modification and what it represents. And since the organ must be modified in order that it may sensate, therefore, it is passive not active ; that is, sensation is a passion and not an action.

CHAPTER XI.

THAT IDEAS OF THE MEMORY ARE SIMILAR MODIFICATIONS AS
 ARE IMAGES OF THE SIGHT, BUT SO IMPRESSED AS TO PRE-
 SENT THEMSELVES BEFORE THE IMAGINATION AND
 THOUGHT, JUST LIKE EXTERNAL APPEARANCES
 BEFORE THE SIGHT.

The memory is the field of images spread before the internal sense,—and which, being then living, are called ideas,—just as the visible world is spread before the external sense or the sight ; for they present themselves before the imagination and thought in similar appearances. By reason of this, the internal sense also must be said to be passive ; though, strictly speaking, it is passive only when modifications are being insinuated

immediately through the outermost doors or those of the external senses.

CHAPTER XII.

THAT BY SENSATIONS THE SOUL DESIRES TO KNOW WHAT IS GOING ON IN THE WORLD BELOW HER, INTO WHICH SHE, AS IT WERE, DESCENDS WHEN FORMING HER BODY WITH ITS SENSORY AND MOTORY ORGANS.

The soul, which is a spiritual and celestial form, cannot be rendered participant and skilled in effects and phenomena which are carried on in a world situated so far and so deeply below herself, except by means of organs which shall be entirely conformable to the forces of her nature, and unless there be a ladder, consisting of organs and sensations, whereby she can descend and ascend from things above to things below and the reverse. It is for this end that the organic body has been formed. The ladder itself is distinguished into such degrees, so that it can be successively let down from the one region into the other. By this arrangement nothing whatever can happen in which the soul does not share. All sensation from the lowest world is lifted up to her as to a certain heaven, and all action passes down from her, as from a heaven, to the lowest world. Therefore, not that which enters in, is important to her well-being; but that which goeth forth; that is, not sensation, cupidity, desires, but actions and effects. By touch, the soul sensates whatever assails [the body] in a general way; by taste, whatever is floating in waters and liquids; by smell, whatever is floating in the atmosphere; by hearing, all the modifications of this same atmosphere; by sight, similar modifications of the ether, and all the beauty that the earth brings forth; by the inmost senses, whatever is carried on in the superior world, and in the region of causes and principles; and so forth.

CHAPTER XIII.

THAT THE ORGANS OF THE EXTERNAL SENSES ARE MOST SKILLFULLY CONSTRUCTED IN ACCORDANCE WITH EVERY FORM OF THE CORRESPONDING FORCES AND MODIFICATIONS.

The eye is constructed in entire accordance with the modification of the ether; the ear, with the modification of the air; the tongue, with the figures of angular parts; and so likewise the membrane of the nostrils. But as to whether the cortical gland is fabricated in accordance with the form of the modifications of a superior ether, this also can be inferred from divers phenomena. To take only one or two specific examples. The ear is so furnished with tympanum, fenestræ, cylinders, cochlea, malleus, and other instruments, that it is a most perfect exemplar of the acoustic art. In like manner, the eye, as an exemplar, represents to its orbit an optical organ of such surpassing excellence that it is framed in accordance with every nature of the influx of the rays of the sun. So also in the other sensories, wherein the inmost arcana of nature lie concealed and represented. The consequence is that the soul, which is the formative substance and force of her body, has deep intuition and cognisance of nature, and, entering into her, forms instruments which have not the least discrepancy with the order and form of her fluxion. For the soul is, as it were, above nature; and hence, in her own little world, is the science, art, order, and law, of the things below her; wherefore, in acting from science, art, order, and law, she acts from herself.

CHAPTER XIV.

* * * *

(Here the MSS. ends.)

THE ORIGIN AND PROPAGATION OF THE SOUL.

BY EMANUEL SWEDENBORG.

CHAPTER I.

THAT THE SOUL IS AN OFFSPRING FROM THE SOUL OF ITS
PARENT.

1. No one, I think, doubts, but that the first soul, or that of the first man, was created immediately by God and poured into a new body; that is to say, that his soul,—which perhaps was like to a vegetative soul, or which was not only spiritual but also natural,—was so purified as to have acquired a spiritual essence and nature. For the vegetative soul differs from living souls or those of the animal kingdom, principally in being not only a spiritual form, but also a natural, that is, in having inferior forms adjoined to it, such as the first, second and third natural forms; but when these latter are cast off or separated, there remains a spiritual form, such as the human is. But let us dismiss these speculations. To divine, is permissible, but let no mortal man seek to penetrate into the mysteries of creation. For the present, I have appointed to treat only of the successive origin of the soul, or of the propagation and traduction of souls from body to body.

2. That the primitive soul of the offspring is from the soul of the parent, is a statement to which not the slightest objection will be raised by anyone who considers [1] That the soul is the all in all in the whole and in every part of its body; for it is the all in all in the simple fibres, and is the principal essence ruling in both bloods, the white and the red. [2] That it is an essence so real that it alone is, lives, sensates, acts. [3] That the soul is the veriest creative and formative substance of its body, that is, the informer of those organic forms of which the body is the last; for organic forms can never be raised up or have existence without a first form or soul; whatever is to be formed or derived successively, must always take its com-

mencement from a first form. We may be still further confirmed in our position if we attend to visible phenomena; such, for instance, as the likeness to both parents in respect to mind, animus and body, which is seen in the common offspring, both in the human race and in other species of animals; to say nothing of the subjects of the vegetable kingdom wherein like procreates like. In the animal kingdom image and likeness is transmitted from parents to remote descendants, nay, from Adam himself to his universal posterity. Moreover, in families there is a general and specific, and also an individual likeness, which, if it does not pass immediately to the nearest offspring, yet passes to the next following, that is, to the grandchildren and great-grandchildren; and in each member there always remains the characteristic mark of the family whereby it is distinguished and known, as apart from other families. If, then, the organic body is the type, image and likeness of its soul; and if the body be from the soul, or from the first form; it follows that the soul of the offspring is from the soul of the parent. Fuller confirmation is added by an examination into the organs of generation in both the male and the female. From these organs, and with the guidance of the anatomy or science of the organs, and of the visible experience of phenomena, we can clearly deduce the mode whereby the first essence of the bloods is disposed for procreation or propagation; for, as indicated above, the soul consists of innumerable simple substances or first forms. Thus the soul of the parent is propagated to the offspring. Not the whole of it, however, is transcribed, but only such ratio, or, if we may be allowed the expression, such small portion of it as shall suffice for the initiation of organic or corporeal forms.

CHAPTER II.

THAT THE SOUL OF THE OFFSPRING IS CONCEIVED IN THE MALE;
BUT SUCCESSIVELY SUPERINDUCES ITS POSTERIOR ORGANIC
FORMS, THAT IS, ITS BODY, IN THE OVUM AND WOMB
OF THE MOTHER.

3. The truth of this proposition receives very manifest confirmation from the organs of generation when deeply scrutin-

ized; that is to say, from the spermatic arteries, veins and nerves, the testicles or didymides, the seminal vessels, the parastatæ or epididymides attached to the upper border of the testicles, the vesiculæ seminales or cellular receptacles, the prostates set in front of the neck of the bladder, the urethra, the glands, both Cowper's and Littre's, and also the seed itself with its living vermiculi; and moreover, from the corresponding organs of the feminine sex, viz.: the womb, Fallopian tubes, ovaries, etc., than all which, in the whole of nature, nothing more wonderful can be offered to the human eye. The particular office performed by each of these organs can be explained only in a special transaction on this subject; but when I was opening them up all the way to their causes, I seemed to myself to have detected the following connection and progression of causes, namely, that in the organs of the male are conceived the first rudiments of the brain, that is, the purer cortex, which, later on, is contained in the cortical gland; and thus, that from this, as from an inchoament of a body, are projected organic forms, which afterwards, in the ovum and womb of the mother,—always, however, under the auspices of this little brain,—successively progress and thus produce a body. This chain of successions is also confirmed by the increments of the little members of the chick in the egg. In order that posterior forms may be raised up by their first form, the work must be carried on successively; since whatever co-exists, cannot exist simultaneously. Otherwise, postreme organic forms could not arise from their next superior forms, and these from their first form; that is, the body from its brain, the brain from its cortical glands, these from their simple cortex, and this from its soul or first, supreme, inmost, simplest and most perfect form. For without the cortex no fibre is produced, and without the fibre no organic form.

CHAPTER III.

THAT SIMPLE SUBSTANCES OR FIRST ANIMAL FORMS ARE CONCEIVED AND EXCLUDED IN AN EMINENT MODE, IN THE SIMPLE CORTEX ITSELF; AND IN THIS WAY IS THE SOUL PROCREATED IN EVERY ANIMAL.

4. The simple cortex, or that which acts inmosty in the cortical glands of the brain, is the first of the organic forms of the soul. Its operation is intellectual or rational, of a nature like our thought. In this simple cortex and nowhere else can the first animal essence be conceived and procreated. For, regarded as to its nature, thought, or the operation of this cortex, is also spiritual, and undergoes actually an infinitude of changes of state, containing, as in a centre, and contemplating in a simple idea, all the things that are in the body. As soon, therefore, as this form is conceived, it is drawn off into simple fibres, and by means of fibres into the whole body; for simple fibres flash from this cortex immediately, like rays of the soul's intellectual light. But this conception and generation is effected in an eminent mode; for, as the brain is an organ for the preparation of the red blood, so the cortical gland is an organ for the preparation of the purer blood, that is, of the animal spirits; consequently, the simple cortex, an organ for the preparation of the first essence of the blood, that is, of the animal essence; these brains and little brains being mutually and ordinately correspondent. But because its generation is not effected from the cortex, but in this simple cortex, and, indeed, in an eminent mode, it must be investigated from the laws or order and by means of the doctrine of forms; and for this reason it does not suffer of being treated in a few words.

CHAPTER IV.

THAT THE BODY AND THE KINGDOM ARE DONE WITH, AS SOON
AS THIS LIVING FOUNT OR PERENNIAL ORIGIN OF THE
SOUL IS ARRESTED.

5. If there be nothing substantial and living in the whole body except the soul; and if this be the one only substance which reigns in single things universally, and in its own universe most singly; and if it be this, from which are the single organic forms, and from which, finally, is the ultimate form, or the body; and moreover, if this be the principal and inmost essence of the animal spirits and red blood, and be so prolific as to furnish inchoaments for the propagations of new forms; it follows that it must arise and spring forth from the above mentioned fountain perpetually, and according to every use and necessity of the kingdom. This is clearly proved by the lack of spirits, resulting from a vast diversity of causes, and giving rise to sickness of the animus, scotomia, lipothymia, syncope, swoon, paralysis, stupor, somnolence, loss of memory, languor of imagination, dullness of thought, indetermination of will, loss of desires, extinction of vital heat, premature old age, and infinite other diseases.

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NOTES BY THE EDITOR.

We call the attention of our readers to the announcement of the Annual Meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION, as advertised in this issue. The remembrance of the stimulating influence of our last annual meeting should ensure a good attendance.

The index printed in our last issue will, on request, be supplied to subscribers in two separate fascicles.

CARL THEOPILUS ODHNER.

The death of the Rev. Professor CARL THEOPHILUS ODHNER takes away from the ultimate activities of the SWEDENBORG SCIENTIFIC ASSOCIATION one of its earliest workers.

In conjunction with MR. CARL ASPLUNDH Mr. Odhner exercised the most active interest in the formation of a body which should devote itself to the study of Swedenborg's philosophical writings, and which should be the means of bringing together in the bonds of a common interest, all students of Swedenborg's philosophy whatsoever their theological affiliations. During later years Mr. Odhner experienced some feeling of despair as to the uses performed by the ASSOCIATION; and one can hardly wonder at this, when one views the small membership of our body, whose uses should enlist the interest and support of a considerable number of the members of the various organizations of the New Church. These uses—the publication and study of Swedenborg's philosophical writings—are international in their nature; and they serve and support that theology for the teaching and promulgation of which so many bodies have been established in England, America, Sweden, Switzerland and other countries. And yet, out of the more than 12,000 persons who constitute

these bodies, only 220 are members of the SWEDENBORG SCIENTIFIC ASSOCIATION.

It was reflection on this that led Mr. Odhner to despair of the continued usefulness of the Association; to doubt whether the uses which it had so bravely and enthusiastically set out to perform, and which he had so deeply at heart, could be carried on by this organization in the establishment of which he had played no small share; to entertain the thought that those uses could be prosecuted with energy and success only by some other body which could enlist a larger support even though it were not theologically neutral.

But during the last year of his life, Mr. Odhner's gloomy forebodings as to our future seem to have passed away, at any rate in part. His presence and active co-operation at the last meeting of the Association indicated his recognition, not only of the essential necessity of the use which the Association represents, but also of the fact, that the Association is alone, among all societies devoted to Swedenborg's writings, in carrying on this use. His love of the use itself brought him to see, that, through all discouragements, the Association must be supported. It was this thought, perhaps, that led him to again manifest that interest in our organization which, in the past, has been so fruitful of happy results.

As one of the founders of the GENERAL CHURCH OF THE NEW JERUSALEM, and one of its most active leaders, MR. ODHNER has played no small part in the history of the New Church. In theology, and the history of the New Church, his high literary gifts have received merited recognition from all classes of New Churchmen. It was as a writer and as a translator of Swedenborg's Swedish works that Mr. Odhner has rendered special service to the cause for which our Association stands; and we had hoped for more work of this kind from his facile and eloquent pen.

But now he is removed from our presence. We know, however, that his spirit still lives. His love for that for which alone we exist, still endures, and when active love endures in the spiritual world, then some manifestation of it,

some fruition of its desires, must needs be made manifest on earth.

THE CONTINUANCE OF MR. STROH'S WORK IN SWEDEN.

In the preface to Professor Odhner's translation of Swedenborg's *JOURNAL OF DREAMS* (noted below), the translator remarks that several passages "seem unintelligible," and these he has "simply translated word for word hoping that some day a phototyped copy of the original text will clear up some of the obscure places." Since these words were penned, the desired phototyped copy has been made, and proof sheets are now available to students, in the Convention Library in Cambridge and in the Academy Library in Bryn Athyn. They are the last fruits of the effort made by the SWEDENBORG SCIENTIFIC ASSOCIATION during the summer of 1917, for the resumption of the work in Sweden. Owing to the support given by the ACADEMY OF THE NEW CHURCH and certain members of the GENERAL CONVENTION, the phototyping was resumed immediately on Mr. Alfred H. Stroh's return to Sweden last September. Unfortunately, owing to the great increase (over 300%) in the price of paper suitable for printing the phototypes, this work had to be suspended after just one-half had been completed. For the completion of the work, so far as the theological MSS. are concerned, there still remain to be reproduced the theological letters to Beyer, von Höpken, Oetinger and others; but it seems inevitable that these must be left, at the earliest, until after the war.

Meanwhile, all support of MR. STROH on the part of the bodies of the New Church has come to an end, and if this state of affairs continues we fear that Mr. Stroh's services, for which his long training has so eminently fitted him, may be lost to the New Church. The matter is deserving of the most serious consideration, for, quite apart from the phototyping of the philosophical manuscripts of which several thousand pages are yet to be done, there remains a vast amount of work which can be done only by one who is stationed in Sweden.

First and foremost comes the continuation of that series of

publications of Swedenborg's Philosophical Writings which was commenced by the ROYAL SWEDISH ACADEMY OF SCIENCES in 1907. Of this series three volumes have thus far appeared, the last having been published in 1911. These volumes contain the original text of the earlier Swedish Scientific Writings, Swedenborg's Scientific Correspondence, the Chemistry, Miscellaneous Observations, Lesser Principia and sundry writings connected with the Principia itself. Under the careful editorship of Mr. Stroh, and by the generous liberality of DR. GUSTAV RETZIUS, of the ROYAL SWEDISH ACADEMY OF SCIENCES, these volumes constitute the best of any previous Latin editions of Swedenborg's writings; and moreover, they comprise a vast amount of material which has never before been accessible to the student.

But though too much cannot be said in recognition of the enlightened and liberal policy of the ROYAL ACADEMY in publishing these works, still the publications themselves would not have been possible without the presence in Sweden of MR. ALFRED H. STROH. Mr. Stroh received no compensation for his scholarly and laborious work as editor, but his work was made possible by the fact that he was being supported by various bodies of the New Church for the purpose of phototyping the Swedenborg MSS.

And now this work, and with it Mr. Stroh's support, has come to an end. Shall the publication of the Royal Academy's edition of Swedenborg's philosophical writings also come to an end? This is the question which we would bring to the serious attention of all who are interested, in whatever way, in the giving of Swedenborg's philosophy to the world; who are interested also in preserving the whole-hearted co-operation in this work which has been so conspicuous in the learned Swedish ACADEMY, and which has had so marked an influence in opening the eyes of the learned world to the philosophy of Swedenborg.

The continuation of the series, of which volumes 1-3 were published in 1907-1911, comprises the *Dædalus Hyperboreus* and sundry writings of the years 1716-1722; the *Principia* with

its continuations on Copper and Iron; the Brain, the Economy of the Animal Kingdom, and the Animal Kingdom. The *Dædalus Hyperboreus* (and also some of the works for 1716-22) is already set up, but there can be no resumption of the work for publication unless something can be done for the maintenance of Mr. Stroh in Sweden.

At the present time the ROYAL SWEDISH ACADEMY has a fund of 4,000 kroner (a little over \$1,000) derived from the sale of the former volumes, and available for the continuation of the printing. The immediate continuation of the work seems therefore to depend solely on whether the bodies of the New Church are able and willing to maintain Mr. Stroh as editor.

SWEDENBORG'S "JOURNAL OF DREAMS."

EMANUEL SWEDENBORG'S JOURNAL OF DREAMS AND SPIRITUAL EXPERIENCES. Academy Book Room; pp. 108; price, \$1.00.

The translation and editing of this work constitute the last of the late Professor Odhner's many productions in the world of books. The translation is an entirely new one (though throughout the translator has compared the version by Dr. R. L. TAFEL, published in the DOCUMENTS CONCERNING SWEDENBORG) made from the original Swedish as published in 1858. The work of the editor consists in a bibliographical Preface, extremely interesting and illuminating footnotes explanatory of obscure allusions in the text, and containing rare information respecting the persons mentioned, and, lastly, a very detailed index. In the informing Preface Mr. ODHNER makes mention of the two English translations made by Dr. J. J. G. Wilkinson and by Baron Holmfeld, of Copenhagen, respectively. We might add, as a matter of interest to the student, that typewritten copies of both these translations are preserved in the Library of the Academy of the New Church at Bryn Athyn.

There seems to be no doubt but that, as pointed out by Professor Odhner, this JOURNAL OF DREAMS is a part of that series of daily records which was commenced by Swedenborg as a description of his travels, and which was published in

Latin by DR. IM. TAFEL under the title, "Itinerarium." This conclusion is supported, not only by the nature of the Journal itself, but also by the fact that the entries, though almost entirely occupied with the daily account of dreams experienced, yet do not omit to occasionally refer to the author's contemporary travels. The record is, in fact, a continuation of the former Journal or Itinerary, but filled mainly with an account of the remarkable series of dreams that the author experienced during 1744 prior to his full intromission into the spiritual world.

For this reason we welcome the new title under which this translation appears. The original MS. bears no title, but the Swedish editor published it under the title "Drömmar," and it has consequently been generally designated as "Swedenborg's Dream Book" or "Book of Dreams." The inadequacy of this title is apparent, and moreover, it fails to connote the place, both historical and psychological, held by this work among Swedenborg's writings.

It is to be hoped that some day the whole of Swedenborg's Journals will be published in one volume. They would constitute a work of not less than three hundred pages, and the publication of such a work would serve the purpose of showing not only the course of Swedenborg's varied travels and experiences, and the nature of his reflections, but also the growth of his state as he approached the time of his illumination, and the true place of his dreams in respect both to the state which preceded and to that which followed.

Meanwhile students will be grateful for the appearance of this little work now published. It marks the beginning of that intermediate state which preceded the days of the ARCANÆ CŒLESTIA, and a study of its pages is essential to any true grasp of the nature of Swedenborg's illumination.

A NEW ADDITION TO SWEDENBOR'S EXPOSITORY WORKS.

THE SCHMIDIUS MARGINALIA together with THE EXPOSITORY MATERIAL OF THE INDEX BIBLICUS, by Emanuel Sweden-

borg, Academy of the New Church, Bryn Athyn, Pa., 1917, pp. 631, with separate sheet containing *errata*. Price, \$3.00.

In this work the Rev. E. E. IUNGERICH, presents to the English reader his transcription and translation of the notes and comments entered by Swedenborg on the margin of his copy of Schmidius' Latin translation of the Old and New Testaments. These notes are for the most part very difficult to read and in several cases the difficulty is greatly increased owing to the fact that the edges of some of the pages are frayed away, entirely destroying part of the writing. Mr. Iungerich is one of the most competent among the students of Swedenborg, for the task to which he set himself, and, needless to say, this task has been well done. Future students, and also Mr. Iungerich himself, will without doubt, and especially in those more difficult parts of the MS to which we have referred, find readings that need revision,* but this is no detraction from the praise due to the persistent, laborious and scholarly work of which this volume is the fruit. Moreover the exactness with which the translator has indicated the additions or conjectures that were necessary in certain places in order to complete the sense, is worthy of great commendation. These notes have never before been printed, nor even transcribed, except as to some small portions.

The volume also includes those parts of the INDEX BIBLICUS—a work at present available only to the Latin scholar—which are expository of the sacred text, the extracted portions being arranged to go with the notes according to the order of the Bible; they are distinguished from the notes by a difference in types. Together, they constitute a volume of exposition which covers almost the entire Bible (though by far the greater part of the book is a very full exposition of the Prophets), and which will prove to be a valuable, and indeed an indispensable, addition to the library of the student and preacher.

*We may here note that comparison of a few places with the phototyped MS has suggested to us the following corrections: p.

56, l. 14, *propheticals* for *parables*; p. 59, *men of Sodom* for [*these things of e*]xternal men.

PROBLEMS RELATING TO SWEDENBORG'S
CHEMISTRY.

BY PROFESSOR REGINALD W. BROWN.

The teachings of the Writings are both numerous and strong in regard to the vital importance of science and philosophy to the New Church, and these teachings are clearly set forth in the series of articles on *Science and Philosophy* in the WORDS FOR THE NEW CHURCH, Vol. I., and in the latter half of Bishop Benade's CONVERSATIONS ON EDUCATION. Furthermore, the students of the Church have generally agreed that the science and philosophy presented in Swedenborg's works written before his illumination, and embodying what was necessary for Swedenborg's preparation, are to form a basis for the development of the science and philosophy of the New Church. As pointed out so strikingly by Bishop W. F. Pendleton in his address on *The Scientific Works of Swedenborg and the Writings*,* there is a marvellous agreement between the great principles set forth in the preparatory works and those enunciated in the Writings. At the same time a very sharp distinction has been maintained to exist between the works published by Swedenborg as a scientist and philosopher, and those published as a Divine Revelation through his instrumentality. The two sets of works are approached and studied from an altogether different attitude of mind; in the one a man is approached, howsoever enlightened we may consider him, in the other the Lord Himself is approached. In the one case the mind is not free to implicitly believe as true everything that is said, without judgment passed on the basis of those criteria of truth which are laid down by revelation for the direction of true rationality in regard to the teachings of men. In the other case, all that is said bears the stamp of Divine Authority, and the only limitations that exist in re-

*In NEW CHURCH LEE, July, 1901; reprinted as supplement to NEW PHILOSOPHY, October, 1901.

lation to it are those of the understanding and interpretation of finite men.

It would seem to be one of the first duties of the New Church to thoroughly analyze Swedenborg's scientific and philosophical works in the light of revealed truth and of those media which the Lord has provided in His creation and providence for the estimation of human wisdom. This is no small responsibility, not only on account of the wide field of subjects that is involved, but also on account of the fact that the material to be considered ranges from universal principles of philosophy to the concrete facts of experience. Comparatively little thorough analysis has so far been carried on in the Church and this little has for the most part been limited to the more general principles which are dealt with in the theological Writings as well as in the philosophical works. It is in this latter field especially that a marvellous agreement has been found to exist between Swedenborg's scientific and philosophical works and the Writings. On account of this agreement there has been a tendency to accept the statements of the scientific and philosophical works *in toto*, including even the ultimate facts there related. But it is a very grave question whether we would be justified in making an *a priori* judgment as to the validity of all statements made in these works. Careful study has, indeed, indicated that there are so great a number of doubtful problems, so many statements of fact so obviously opposed to experience that it would be unwise to try to pass any *a priori* judgment, even to say to what extent limitations may be expected in Swedenborg's science and philosophy. All we can say is that what is in agreement with revelation is so far true. The logical course before us seems to be to regard what Swedenborg records in his preparatory works affirmatively because what is there presented whether absolutely true or not was the means which led to his intellectual development and prepared him to understand spiritual things in a very exceptional and marvellous way. We know from revelation, however, that the Lord leads man through appearances, and that even fallacies and falsities are not such

in the sight of heaven when the ends of man are good; that even these may be made the means to more interior things in the providence of the Lord.

We have often been struck by the fact implied by the writer of the classic articles on *Science and Philosophy* in WORDS FOR THE NEW CHURCH, where he says, "We would not, however, here affirm the correctness of every fact given in these [Swedenborg's] scientific works, but we believe that the later and more exact data generally serve as well, and often even better, as the basis of those principles he has evolved."* This fact is so well illustrated in connection with Swedenborg's Chemistry, that it seems very useful to analyze some of the problems which this work presents, and which, together with similar problems in others of his works, must be fully considered and mastered before we can possibly consider ourselves in a position to pass rational judgment upon the validity of Swedenborg's statements in his scientific and philosophical works as a whole. THE CHEMISTRY being one of the earliest works, and dealing, as it does, with a very ultimate and concrete field of experience in which there has been a very wonderful and practical development since Swedenborg's day, might naturally be expected to present great numbers of problems. This has proved to be the case and the problems may serve to throw a great deal of light on the field of research which lies before the students of Swedenborg's science and philosophy.

WATER PARTICLE OF THE CHEMISTRY *versus* WATER PARTICLE
OF THE PRINCIPIA.

There is probably no more important problem in establishing the status of Swedenborg's CHEMISTRY of 1721, than that involved in the difference between the water particle on which the theory and calculations of the CHEMISTRY are based, and the water particle of the PRINCIPIA of 1734. The internal structure and the relative masses of the two particles are entirely different, so different, indeed, that if we were to adopt

*Words for N. C., vol. I, p. 516.

the water particle of the PRINCIPIA as a true description of the water particle of nature, all the calculations relating to mass and density which play so important a part in the CHEMISTRY would fall to the ground, except for the valuable suggestion they give as to the method of calculation. The importance of the difference in the structure of the water particles of the two works becomes the more striking when we realize that Swedenborg apparently counted on the close agreement of his calculated values for the density of the various substances treated of, with the experimental values of his day as a confirmation of his theories.

Before considering in detail the differences between the water particles of the two works, we will first point out their points of resemblance.

Points of resemblance:

1. The water particles of both the CHEMISTRY and the PRINCIPIA are spherical.

2. In both cases the particles are said to be of the sixth order of composition, being called "hard particles" or "crustals" of the sixth kind in the case of the CHEMISTRY, and sixth "finites" in the case of the PRINCIPIA. (CHEM. IX:1, *Description of the Particles of Water*. PRINC. III:ix. *On Water or the Purely Material Finite*.)

3. In both cases the surfaces of the particles are said to be rough, due to interstices between the spherical particles of which the surfaces are made up. (CHEM. IX:3⁴; XI:2². PRINC. III:ix:2.)

4. In both cases the particles are said to be held apart in a fluid state by an active interfluent medium described in the CHEMISTRY simply as "fire," "subtle matter," or "subtle igneous matter" and in the PRINCIPIA as ether. (CHEM. IX:2, 4; XII: Appendix, p. 84. PRINC. III:ix:2.)

Points of difference:

The general points of difference may be seen at a glance from the diagrams of the particles as reproduced in Fig. I., illustrating the water particle, as described in the CHEMISTRY

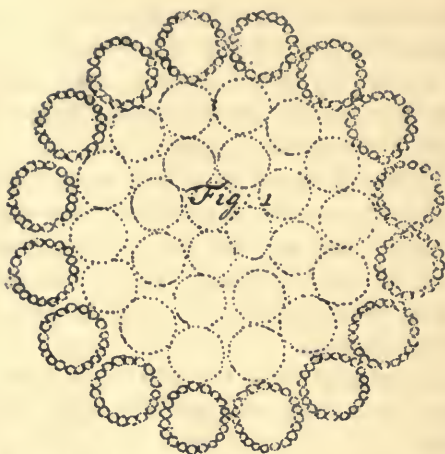


FIG. I. THE WATER PARTICLE OF THE CHEMISTRY. The diagram represents a cross section through the center of the water particle. The outer layer, the only part of the particle to which Swedenborg attributes weight, consists of "crustals" or "hard particles" of the fifth kind, each having a similar surface composed of crustals or hard particles of the fourth kind. The interior filled with dotted circles represents the "hollow" "cavity" filled with subtile matter or fire.

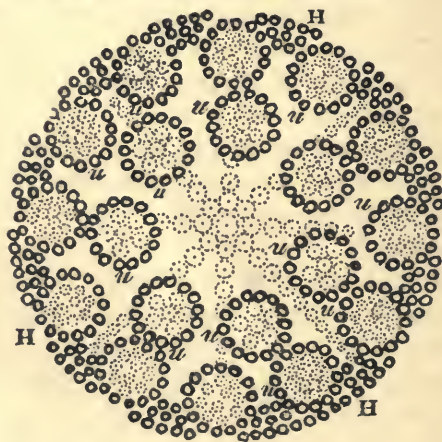


FIG. II. THE WATER PARTICLE OF THE PRINCIPIA. The small circles around the circumference, in places forming several layers, represent the "fifth finites" of the surface. The larger circles within made up of small circles represent "spherules" whose surfaces likewise consist of "fifth finites." In this case the interior as well as the surface of the water particle has weight.

and Fig. II, illustrating the water particles as described thirteen years later in the *PRINCIPIA*. It might be added that the water particle as described and illustrated in the *LESSER PRINCIPIA** agrees substantially with that of the published *PRINCIPIA*, while the diagram illustrating the compression of the air particles in the *MISCELLANEOUS OBSERVATIONS*† suggests an intermediate conception.

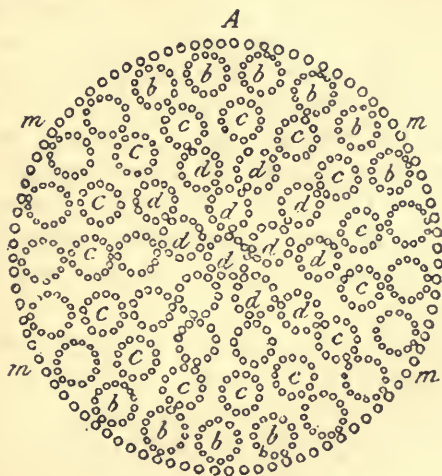


Fig. 98.

FIG. III. THE WATER PARTICLE OF THE LESSER *PRINCIPIA*. The outer circumference of small circles represent the surface of the particle consisting of "eighth particles." The circles within represent "spherules" whose surfaces also consist of "eighth particles."

I. According to the *CHEMISTRY*, the water particle consists of a surface composed of a single layer of crustals or hard particles of the fifth kind, whose diameter is $1/10$ that of the water particle; and of an internal cavity whose volume is equal to the volume of the superficial crustals, or to $1/2$ the total volume of the water particle (*CHEM. X:4²⁻³*), and filled with "subtle matter" (*CHEM. IX:1⁸; XIV:2⁵*); whereas the

*Reproduced in Fig. III.

40. See text, page 92. English

†Misc. Obs., Plate VIII, Fig.

edition, London, 1847.

water particle of the *PRINCIPIA*, as well as that of the *LESSER PRINCIPIA*, consists of a surface composed of several layers of fifth finites, surrounding an interior filled with spherules having surfaces of fifth finites containing elementaries within. (*PRINC. III:vii:11*; *ix:1*. *LESSER PRINC. 160-161*.)

2. Although both water particles consist of particles said to be of the fifth order of composition, these particles are themselves of an altogether different composition, nature and density, those of the *CHEMISTRY*, called "crustals" or "hard particles," being exactly of the same structure and general nature is the water particle itself (*CHEM. IX:14*), whereas the fifth finites of the *PRINCIPIA* are of a type of structure radically different from that of the water particles of the same work. (*PRINC. III:ix:1*.) Indeed, the conception of the whole series of particles which precedes the water particle and enters into its composition is different from that of the finites of the *PRINCIPIA*.

3. It would follow that granted the water particles in both works were conceived to be of the same size, the mass of the water particle of the *CHEMISTRY*, on account of the difference in its structure and constituents, would be much less than that of the *PRINCIPIA*, insomuch that were the latter substituted for the former, the calculations would no longer agree with experimental values, and the conception of all the substances dealt with would have to be modified.

4. It will readily be seen also that the character of the so-called roughness of the surface of the particles would greatly differ on account of the difference in the size of the particles of which those surfaces are pictured as being made up. This again would modify the superficial character of all the particles which are supposed to have been moulded in the interstices of the water particles. As to the size of the fifth order of particles of which the water particle is said to be composed it will be seen, at a glance, that the "fifth finites" of the *PRINCIPIA* are conceived of as being very much smaller than the "fifth crustal" of the *CHEMISTRY*.

MANY OF THE DIAGRAMS OF THE CHEMISTRY ARE MISLEADING
ON ACCOUNT OF THEIR INACCURACY.

Many of Swedenborg's diagrams give a very mistaken idea of the relative size of the "salt particle" and the water particles leaving an impression on the mind which is entirely out of harmony with the actual description which Swedenborg gives of the relative size of these particles. The inconsistency arose out of the difficulty, apparently, of attempting to diagram such particles on a flat surface, the result being to picture the salt particles as too large in proportion to the water particles and with "arms" or "arcs" extending too far around the water particles. (Compare Figures B, F, and E in Plate IV. of the CHEMISTRY with the *Description of the particles of common salt* in the text, Part XI:1.)

In order to obtain a more accurate visual picture of the interstices between the water particles in the "fixed quadrilateral pyramidal position" in which salt particles are said to have been formed and to which they are exactly moulded according to Swedenborg's description, the writer, in co-operation with the late Jesse Burt, made plaster of Paris models of these interstices. The success of the undertaking and its usefulness to students of Swedenborg's Chemistry led Dr. E. A. Farrington to make similar models and publish photographs of them in the NEW PHILOSOPHY. (See the Frontispiece of this journal for October, 1905.) Dr. Farrington's model is somewhat too massive, but a study of it will serve to bring out a few important points, and especially the fact that Swedenborg's diagrams of the salt particle (*e. g.* CHEM., Pl. IV., Figs. B, F, E)* are purely diagrammatic. It will be seen that the diagrams do not represent any possible section of the actual model. That whereas Swedenborg's drawings give the impression that the arms of the salt particle reach more than half way around the salt particle, the fact is that according to the more accurate description, the greatest extension possible is only 180° , (CHEM. XI:1), the arc being much less when the so-called ramenta are broken off, the condition which the dia-

*The references to the Plates translation of the CHEMISTRY, and Figures are to C. E. Strutt's London, 1847.

grams are supposed to represent.* That whereas Swedenborg's drawings necessitate a considerable separation of the water particles as shown in Plate IV., Figure E, and especially in Figure G, the fact is that according to his description the water particles should be in contact, *i. e.*, in the fixed quadrilateral pyramidal position.† Swedenborg himself seems to have been misled by his own method of diagramming in connection with the structure of crystalline salt, for the details of this structure, as shown in Plate IV., Figure G, are quite inconsistent with his general theory.

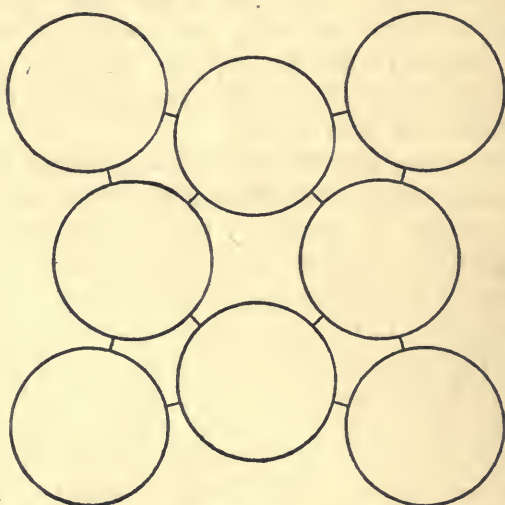
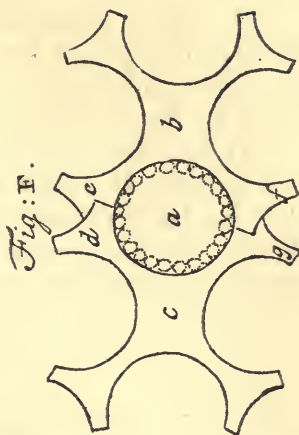
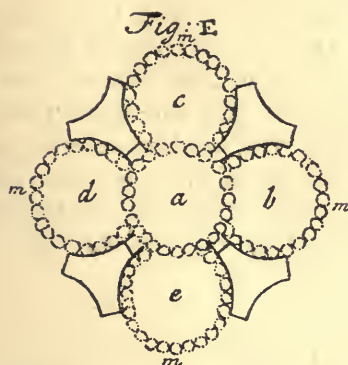


FIG. IV. SWEDENBORG'S DIAGRAM OF THE SALT PARTICLE. (Compare Plate V, Fig. L, Clissold's translation of the CHEMISTRY.) The circles represent water particles. The figure included within the eight water particles represents the salt particle with its central cube or "stoma" and triangular appendages or "acids." The diagram reveals the following points at variance with Swedenborg's description:

1. The water particles are not in contact as they should be in the "fixed quadrilateral pyramidal position."
2. The four outer water particles are not in alignment with the four inner ones as they should be in the fixed quadrilateral pyramidal position.
3. The "arms" of the salt particle are represented as extending more than 180° around the water particles.
4. The diagram corresponds to no possible section of the salt particle as described by Swedenborg.

*CHEM. xiv, 1.

†*Ib.* xi, 1; x, 1; 4.



FIGS. V [E] AND VI [F]. Reproductions of DIAGRAMS OF THE SALT PARTICLES from the CHEMISTRY. (Compare Plate V, Clissold's translation.) (These diagrams illustrate in an even more exaggerated way some of the points mentioned under Fig. IV.

The magnitude of the error of the diagrams appears to be greater than at first sight when we consider Swedenborg's statement in Part XIV:1, and the diagrams illustrating it. He says, "If the genuine figure of salts* be examined, as they originated at the bottom of the sea, which figure I have demonstrated theoretically, it will be found that in its first origin, that is, when it lay in its encasings and as it were in its cradle, it is not altogether such as we have described it in the diagram, but still possessed of certain acuminated and thinner portions. Thus, at its first origin, the acid particle is not exactly according to Fig. 1 (Plate XI), but according to Fig. 2." Presumably the same sort of modification took place in regard to the central cube by the breaking off of corresponding acuminated portions or "ramenta." The general effect of this ramental abrasion must have been to decrease the size of the ordinary "salt particles" and to make them smaller rather than larger than the interstices between water particles in contact, as in the position described as existing during their original formation.

*Salt particles.

Swedenborg's diagrams so far as they involve the picturing of the salt particles are therefore far from accurate representations of his theory. Neither did he correct his calculations for the density of salt or any of its derivatives in such a way as to allow for the ramenta,* which are removed from the particles of common salt and acids. It is important to bear this in mind in reference to the fact that has been referred to before, that Swedenborg's calculations in so many cases, especially as regards the specific gravity of common substances, is apparently closely confirmed by known experimental values.

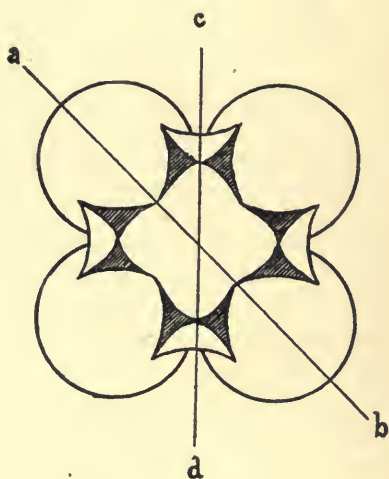


FIG. VII. View of one of the six sides of the SALT PARTICLE drawn in relation to water particles in the fixed quadrilateral pyramidal position in accordance with Swedenborg's mathematical descriptions in the text of the CHEMISTRY. Water particles placed in the concave (unshaded) portions of the salt particle would fall into the position required by the theory.

Considering the number of sources of error involved in Swedenborg's methods of calculation, it appears that he merely worked to satisfy these accepted values.

*See *Chem.*, p. 113-114.

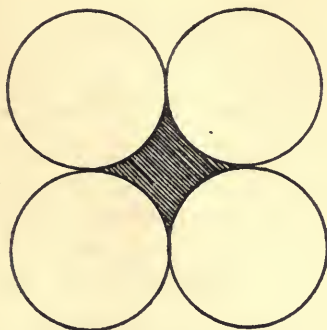


FIG. VIII. CROSS SECTION OF THE SALT PARTICLE in the plane perpendicular to ab , Fig. VII. It will be seen that the central "cube" (shaded) is much smaller in relation to the water particles than is represented in Fig. IV.

z

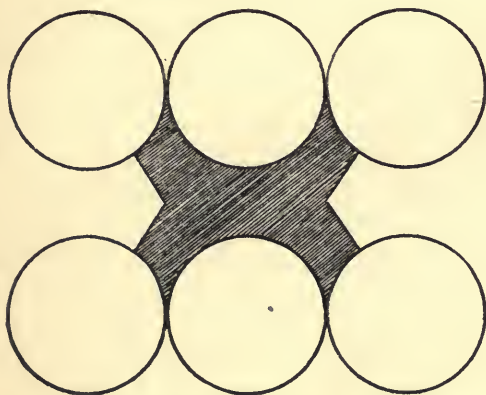


FIG. IX. DIAGONAL CROSS SECTION OF THE SALT PARTICLE in the plane perpendicular to cd , Fig. VII. This is the only plane possible through the center of the particle which will pass through four of the "triangular" or tetrahedral appendages. It will be seen from this diagram that the greatest possible arc in any concave surfaces of the salt particle is only 180° as explained by Swedenborg in the text of the CHEMISTRY.

[To be continued.]

ACTION.

BY EMANUEL SWEDENBORG.

CHAPTER I.

THAT THE ACTION OF THE WHOLE BODY, AND OF ITS VISCERA
AND THE PARTS THEREOF, IS CARRIED ON BY MEANS
OF MOTOR FIBRES AND MUSCLES.

From the first stages and the successive growths of the animal embryo, it is evident that it is the muscle and its action that is determined in the last place. The first fibre of all, that is, the simple fibre, while fresh sprung from its natal cortex, goes into convolutions and constructs the medullary or nerve fibre; and this again constructs the blood vessels; to the end that the nerve fibre and the blood vessel may together construct the motor fibre whence comes the muscle. Thus the last determination is the motor fibre, by whose means is produced action. But we have the more simple motor fibre, and the compound motor fibre. The more simple is composed of bare nerve fibres together with capillary vessels within which is the purer blood; while the compound is composed of nerve fibres together with capillary vessels and vessels of the red blood; for into every muscle flows both a nerve and an artery. But to continue: The universal body, the viscera of the body, and the parts of the viscera, are constructed of motor fibres alone. The cause of this is, because there is nothing therein that is not born and made for the production of some action, in order that thus, by means of real acts, there may be represented in outmosts, an exemplar of the soul; which latter, in respect to its quality, could not appear in the ultimate world unless it became active by means of muscles.

CHAPTER II.

THAT THE BODY IS SO ARTICULATED BY MEANS OF MUSCLES, THAT
NO PART IS WITHOUT ITS OWN MOTION AND ACTION.

The first inspection and contemplation of the animated body when denuded of its integuments make it evident that the body is so distinct and articulated with muscles as to represent all possible actions whatsoever that can be conformable to the operations of the soul. The heart is, in all respects, muscular, and is so articulated that it can be expanded, compressed, flexed and reflexed, in a thousand ways; and the same is true also of its auricles. Likewise also the lungs, stomach, intestines, liver, diaphragm, etc.; so that whatever is called corporeal, is also muscular, or, what amounts to the same thing, is adapted for motion and action. There is not a single artery which, girt as it is with muscular circles, does not accommodate itself to the blood and its fluxion; and so likewise with every little fibre of the circle. This is manifestly apparent from the fibres, which are the least parts of the body; for each one of these enjoys its own proper activity, but in such way that it is at the same time bound in with others, so that when it acts for itself it acts also for the community. Such likewise is the condition of the parts of the whole body and of its viscera. Therefore, that in the body, which is not active cannot be said to be animate or animated; for the end of the formation of each part is that it may operate answerably to the force of the soul.

CHAPTER III.

THAT EACH INDIVIDUAL PART OF THE ANIMATE BODY ENJOYS
ITS OWN PROPER MOTION; AND THAT EACH ACTION
CONSISTS OF AN INFINITY OF MOTIONS AS PARTS.

That each individual part, even the very least, enjoys its own proper active force is a point which we learn especially from the embryo in the womb and the chick in the egg. Each fibre is so separated from its companion, and at the same time

so bound to it by ties, that while promoting its own cause it promotes also the general cause. But as we advance to manhood and old age, one fibre coalesces with another, or one is disjoined from another, whence results confused and indistinct action. For whether the individual part acts separately, or whether it acts entirely in union with another part, there can be no liberty, the absence of which does not also mean the absence of harmony. The more, therefore, the viscera and the parts of the viscera are distinct and free, and the more, at the same time, they are unanimous and conjoined for the guarding of the general weal, the more perfect is their state; for so, and not otherwise, can the body carry out the decisions of the mind whose operations are in things most single. This is also corroborated by experience, for as soon as the parts either grow together or are separated, the obedience and integrity of the body is at once destroyed.

CHAPTER IV.

THAT THE NATURE OF THE ACTION IS ACCORDING TO THE NATURE OF THE MUSCLE.

If the muscle be the instrument or organ of action, it follows that on the situation, connection and quality of its fibres depends the form of that action. For a muscle consists of a fleshy belly and a tendon, and these can be divided into other constituents, exactly similar though smaller. The tendon is also separated into as many fibrils as the muscle. Moreover muscles are invested with many membranes, and these membranes are tenuous and cellular. Into each muscle enters both an artery and a nerve; and when the muscle is moved and relaxed, the blood is reciprocally pressed out and drawn in with great force. It is on all these circumstances that the form of the muscle and the form of the action manifestly depends. But what the nature of each motor fibre is, has not yet been investigated. Meanwhile, that action is entirely dependent on the state of the muscle, is apparent in paralysis, tetanus, spasms, and convulsions, and from cases where the fibre or artery has

been cut, relaxed, torn or obstructed. Therefore, as the form of the muscle is, such is the form of the action.

CHAPTER V.

THAT THE BODY LIVES IN ACTING, AND ACTS IN LIVING.

The body is said to die when it ceases to act; and the more perfectly it acts the more perfectly does it live. Therefore, when any member is deprived of its action it is said to be extinguished. The ultimate form of the soul is the body with its members. These members do not live unless they live, that is, act, under the arbitrament of their mind; for they are ultimate determinations, which do nothing from themselves, but only from a superior power which determines them, and in which is life. Hence the life of the muscle is action. This is the reason why death first seizes the members, limbs, and muscles, and then by degrees advances to the inner parts. For we cease to act before we cease to will action, that is, to live.

CHAPTER VI.

THAT WITHOUT THE ANIMAL SPIRIT AND THE BLOOD, OR
WITHOUT THE FIBRE AND THE ARTERY, THERE
IS NO MUSCULAR ACTION.

This is evident from experience alone. Into the muscle enters both a nerve and an artery. Within the muscle the nerve and its fibre entirely vanishes away, and the artery is so ramified through the body of the muscle that the muscle appears to be wholly arterial and sanguineous; with the artery there is also a corresponding vein. From this it is clear that the muscle is constructed of arteries and fibres* alone, or that nothing rules principally† in the muscle except the artery and fibre,* that is, except the blood and the animal spirit. There-

*The Latin has *vena*, but it is apparent from the context that this is a slip for *fibre*.

†i. e., from firsts or principles.

fore, when the artery or nerve have been injured, cut, compressed, loosened, the action of the subjacent muscle is destroyed in proportion to the degree of the injury. But as to how the one and the other of these two constituents flows in, this we will learn from a theoretical examination of the fibres and vessels, or of the animal spirits and the blood. The blood vessel is made up solely of fibres. Therefore, when the fibre acts, the artery is constricted and the blood expelled; and when the fibre does not act, the blood rushes in and restores the artery. Hence comes the reciprocal action of muscles, that is, their action and reaction; for the blood is passive and reagent against the spirit, which latter is active. But the texture of the motor fibre does not allow of being explained to the satisfaction of reason, without premised experimental data.

CHAPTER VII.

THAT THERE ARE THREE GENERAL SOURCES OF THE MOTIONS AND ACTIONS OF THE ANIMAL BODY, NAMELY, THE ANIMATION OF THE BRAIN, THE SYSTOLE AND DIASTOLE OF THE HEART, AND THE RESPIRATION OF THE LUNGS; AND THAT THERE ARE MANY SPECIFIC SOURCES, AND INNUMERABLE PARTICULAR ONES.

Of the actions of the animal body, there is an entire series, order and form. For there are superior universal actions and inferior universal actions; or, there are general, specific and individual actions. The one is under the other, and the one is within the other, just as in the case of substances; for action flows from substances as from its instrumental causes. The most universal source of the motions and actions of the body is the animation of the cerebrum, cerebellum, medulla oblongata and medulla spinalis; for by this animation the whole nervous system, or the whole organic body, is inspired and vivified with its active spirit. A less universal source is the systole and diastole of the heart; for its motor fibres and those of the arteries and veins, depend on the inspiration of

the nerve fibres. A still lower universal source is the respiration of the lungs which concurs both with the animation of the brain, and with the systole and diastole of the heart. The other motions of the body, which are called special motions, are like streams flowing from the above three as from their sources. These special motions are the motions of the several viscera and members. Each single member enjoys its own proper motion and its own proper action; that is to say, the stomach and intestines enjoy theirs, the liver, pancreas and spleen theirs, and also the arms, loins, feet and fingers or toes theirs; so likewise with all the other parts whatsoever that are within the body. There are also particular motions in each viscus, such as the motions of the glands, vesicles, and delicate muscles, of which the member as a whole is composed. To these again belong motions still more particular, such as the motions of the motor fibres in each tiny muscle and in each gland; of the arterial and venous vessels in these; of the nerve fibres in these; and of the simple fibres in these; and so forth. The corporeal system is the more perfect in the degree that its several active forces are more perfectly distinct, but yet conspire with universals in finer harmony.

CHAPTER VIII.

THAT SPEECH IS THE ACTION OF THE TONGUE, LARYNX, TRACHEA, AND LUNGS.

For to the end that an articulate sound or a word may be enunciated, the tongue, which is entirely muscular, must be folded in divers ways, the fauces applied, and the larynx moulded, in accordance with the nature of the sound; so also with the trachea; and the lungs which administer the air, must likewise accommodate themselves to the several operations. Thus for the articulation of a single sound there is required a concurrence of innumerable motor fibres. But the action of the tongue differs from the action of other members, solely in velocity and volubility. That the motions of one member may be of the utmost velocity, while those of another

are slow and sluggish, is clear from birds and insects which vibrate their wings with such persistent rapidity that the alternating activity appears like one continuous rest, and is heard as the sound of a murmur. The speech of the tongue flows from the same source as that from which flow the other actions of the body.

CHAPTER IX.

THAT THE CORTICAL GLANDS IN THE CEREBRUM AND CEREBELLUM
CORRESPOND TO THE MOTOR FIBRES IN THE MUSCLES OF
THE BODY; AND CONSEQUENTLY THE ACTION OF THE
GLANDS TO THE ACTION OF THE MUSCLES.

The nerve fibre has its existence from the cortical gland; hence the latter determines the former. But the last determination of the same fibre is the motor fibre of the muscle, for in this it is terminated. Therefore, the first and the last, that is, the two extremities, must needs mutually correspond to each other. Thus the cortex of the cerebrum and cerebellum is the agent, and the fibre of the muscle is the patient, that is, is bound to act according to the force impressed by the efficient cause. The motor fibre is the cause of action; but it is the cortical gland which causes the fibre to act. In this way every action of the body flows from the active force of the cortical cerebrum and cerebellum.

CHAPTER X.

THAT THERE IS NOT A CORTICAL GLAND IN THE BRAIN WHICH
DOES NOT CORRESPOND TO ITS OWN MOTOR
FIBRE IN THE BODY.

From each cortical gland proceeds a single medullary or nerve fibre; this is carried down into the body, in order that it may take hold of some part of a sensation, or produce some part of an action, consequently into its corresponding motor fibre. One and the same fibre cannot perform a double office at its extremities; that is to say, it cannot actuate two motor

fibres, for the result would be an indistinct action. For this reason there is the same luxuriance of cortical glands in the cerebrum, cerebellum, medulla oblongata, and medulla spinalis, as there is of motor fibres in the body.

CHAPTER XI.

THAT THE CORTICAL GLAND OF THE CEREBRUM AND CEREBELLUM
CANNOT ACT INTO ITS MOTOR FIBRE OF THE BODY, WITHOUT
AN ACTIVE OR LIVING FORCE, THAT IS, WITHOUT
EXPANSION AND CONSTRICTION.

The case is not unlike that of the artery, which cannot act upon the blood, and, through the blood, upon the ultimate organic parts, without the active force of the heart, that is, without its systole and diastole; for with the arresting of the heart, the pulse and the action of the blood are also arrested. So likewise with the cortical gland, which is a heart in least effigy: unless this be expanded and constricted, the animal spirit could never be expelled and could never excite the motor fibre to action. From absolute rest in the principal, follows rest also in the effect dependent thereon. That the cortical glands respire and animate, and thus impel the active spirit into the extreme muscles, is confirmed by experience. For the cerebrum perpetually rises and falls, that is, animates; and unless this motion began in the cortical glands it could never begin in the fibres and vessels. The same is also apparent from cases of apoplexy, epilepsy, and catalepsy, and from the several diseases of an affected cerebrum. For as soon as the arterial vessels of the cerebrum (or even the venous) are obstructed, and space for action is denied the cortical gland, from any cause whatsoever, the action of the muscles and the sensation of the organs at once cease.

CHAPTER XII.

THAT THE CEREBRUM IS SO ARTICULATED AND SUBDIVIDED, THAT IT CAN EXCITE TO ACTION A GREATER OF LESSER NUMBER OF CORTICAL GLANDS, AND THUS CAN PRODUCE BY THE MUSCLES WHATSOEVER ACTION IT WILLS.

The cortex of the cerebrum is so divided and subdivided that each individual gland can be expanded and constricted; in like manner also a smaller or larger number of glands, nay, an entire congeries, and also the whole cerebrum; for there are intervening anfractuosities, furrows, channels, and spaces which mark the distinction between each partition. It is in the power of the cerebrum to render active whatever fibres or forces it wills, and consequently whatever motor forces of the body. Hence it follows that the cerebrum can animate, or excite to action, now an entire muscle, now a part thereof, and, simultaneously, another muscle or a part thereof; and also that it can in a moment transfer the action of one muscle into another, and so produce the harmonious and pleasing form of any given action.

CHAPTER XIIa.

THAT VOLUNTARY ACTION IS A SPECIAL AND PARTICULAR ANIMATION OR EXCITATION OF THE CORTICAL GLANDS OF THE CEREBRUM SUBORDINATE TO ITS GENERAL ANIMATION.

The fact that the whole cerebrum expands and constricts, is no hindrance to the ability of each of its separate parts to expand and constrict in a different way; for a general motion and action never hinders such as are special and particular, but rather promotes them. That the parts also can be elevated, and this separately, depends solely on the form, that is, on their situation and connection. Of such nature is the situation and connection of the cortical glands of the cerebrum; hence arises its voluntary faculty. But when the cortical glands are held as it were united and compact, with their smallest interstices and divisions obliterated, as in sleep, lethargy, carus,

then this voluntary faculty or activity ceases; but as soon as they are again elevated, as in wakefulness, the individual parts are roused to voluntary action. It is therefore animation of the glands that produces action, for by animation, the animal spirit is transmitted to the motor fibres, wheresoever they are planted. Therefore, it would be worth while to enquire whereabouts in the cerebrum, whether in its vertex, its borders, or its mass, are situated the cortical glands that correspond to any given group of motor fibres in the body.

CHAPTER XIII.

THAT SPONTANEOUS AND NATURAL ACTION FLOWS FROM THE
GENERAL ANIMATION OF THE CEREBRUM AND CEREBELLUM
UNDISCRIMINATED BY ANY PARTICULAR ANIMATION.

Spontaneous and natural action is opposed to voluntary action, the former being general, consequently indiscriminate, indistinct and obscure, and the latter discriminate, distinct, and proper to the individual parts. The cerebellum is not so well divided into beds, groups, and masses, each with its own distinct motion, as is the cerebrum; which is the reason why the action of the cerebellum is natural, while that of the cerebrum is voluntary; and, therefore, in time of sleep, the action of the cerebrum, being then a general action, is also natural. But the nature of these two brains in other animals, and the nature of the medulla oblongata and medulla spinalis, must be learned from their form and state, that is, from the situation, connection and coexistence of the cortical glands and of the muscular fibres corresponding thereto; for everything owes to its form that it is such as it is found to be. Add moreover, that the cortical glands of the cerebrum, by virtue of their ability to separate, can be stretched to any degree, as in wakefulness. It is worthy of observation that the general animation, both of the cerebrum and of the cerebellum, causes the muscles of the whole body,—except the muscles of the lungs and heart,—even though in perpetual action, to be nevertheless maintained in their equilibrium by means of antagonistic muscles.

CHAPTER XIV.

THAT IN MOST OF THE BODILY MUSCLES, THERE IS A FIBRE BOTH OF THE CEREBRUM AND OF THE CEREBELLUM ; CONSEQUENTLY, THAT IN SUCH MUSCLES THERE IS BOTH NATURAL AND VOLUNTARY ACTION.

That the fibre of the cerebrum, or the motor-voluntary fibre, does not enter into any muscle singly, but is mostly associated with fibres of the cerebellum, may be judged from the very action of the limbs and muscles of the body. In wakefulness all the voluntary muscles stand in utmost readiness at the nod of the cerebrum, while in sleep they live under the auspices of the cerebellum ; in fact, I hardly believe there is a single muscle devoted to voluntary motion, which is not also approached by a fibre of the cerebellum. In such wise also are the fibres in the head itself commingled, for fibres of the cerebrum wonderfully entwine and unite with fibres of the cerebellum, first in the annular protuberance, then in the region of the testes, and afterwards in the medulla spinalis ; thus, like married partners as it were, they run together, in every nerve and in every muscle. This is especially evident in the two lungs. The lungs breathe both day and night, whether the cerebrum is asleep or awake ; and so great is the union of the two influences, that in the daytime, there is not a moment of the respiration, in which the natural and the voluntary are not commingled in the very act of respiration,—a fact which we may observe in ourselves, if we give careful attention to the alternations of the respiration ; for the respiration is carried on in accordance with every state of the cerebrum, its animus and mind. But to proceed. There are viscera of the body which are actuated by the fibre of the cerebellum alone, such as the pharynx, stomach, intestines, mesentery, heart, liver, pancreas, spleen, testicles, epididymides and many others. Again there are viscera which partake equally of the fibre of both brains, such as the trachea, lungs, eyes ; and there are others wherein the fibre of the cerebrum rules, as in the muscles

of the head, neck, thorax, abdomen, arms, loins, feet, and fingers or toes.

CHAPTER XV.

THAT ACTION IS INDEED DETERMINED BY THE CORTICAL GLANDS
BY MEANS OF A MODE OF EXPANSION AND CONSTRICTION ;
BUT THAT WITHIN THE GLANDS RESIDES THAT WHICH
EXPANDS AND CONSTRICTS THE GLANDS THEM-
SELVES, THAT IS, EXCITES THEM TO ACTION.

The expansion and constriction of the glands causes the animal spirit to be expressed into the nerve fibres, and through these, into the motor fibres, whence results action. In this way the gland is the determinant of actions. The gland itself, however, must be determined by some inner and superior active force, since it cannot determine itself. Therefore, in the gland there is a living something which has will, power and action, that is, which can in a moment excite the glands to act in such and such way and in no other. The cause of action must therefore be sought for still more deeply ; and when we have made this search, we find the prior cause in a certain purer, inner, and simpler cortex which is contained in the gland itself as in its own most diminutive brain. The simple cortex has been previously treated of, to wit, that in it resides our intellectual or rational mind whose office it is, to perceive, think, conclude, will, determine into act. This gland, moreover, is furnished with its own most simple fibrils and vessels, and it puts on divers states according to the changes of the mind. Therefore the mind is the determinant of the action of the gland, and this, of the action of the muscles. But the first determinant of all is the soul, without whose consent nothing can come into effect.

CHAPTER XVI.

THAT IN THE MIND WE VIEW AND EMBRACE AN ENTIRE ACTION
BEFORE IT EXISTS.

Compound actions exist from the motion of different muscles, and of different motor fibres in the different muscles. These muscles and fibres are determined by some superior power and force. This power and force resides in the cerebrum, from which, as from their source, actions are derived. In the cerebrum is the power of thinking and willing, while in the body is the power of acting, and of executing the thing thought. Therefore when the cerebrum is injured, obstructed, or concreted, the faculty of thinking and willing is lost, and therewith, in the body, the faculty of acting; as is apparent in cases of catalepsy, epilepsy, apoplexy, lethargy, etc. And since the actions of the body proceed from the cerebrum, so, undoubtedly, they proceed from the mind of the cerebrum. Speech, which is action of the tongue, lips, palate, larynx, trachea and lungs, never exists without a previous view of the thing to be uttered, that is, without premeditation; therefore, as the thought is, such is the speech. Walking, dancing, tossing of the arms, gesticulation, change of countenance and expression, and other actions, never come of themselves, but only by command; the body, which is commanded, merely executes. Hence it follows that the whole action of the body is first embraced in the mind.

(To be continued.)

THE NEW PHILOSOPHY.

Vol. XX

JULY, 1918

No. 7

TRANSACTIONS

OF THE

TWENTY-FIRST ANNUAL MEETING

OF THE

SWEDENBORG SCIENTIFIC ASSOCIATION.

The Twenty-first Annual Meeting of the Swedenborg Scientific Association was held in the Church Building of the First New Jerusalem Society, in the City of Philadelphia, on Friday, May 31st, 1918. President Lewis F. Hite occupied the Chair.

AFTERNOON SESSION 2:30 P. M.

1. On motion the Minutes of the Twentieth Annual Meeting as published in the NEW PHILOSOPHY for July, 1917, were adopted.

2. The Chair appointed Mr. L. E. Gyllenhaal a Committee on the roll. The Committee reported an attendance of twenty-five members and ten visitors.

3. The Treasurer reported that the Membership of the Association and the Subscriptions to the NEW PHILOSOPHY were as follows:

MEMBERSHIP:

Net Membership, May, 1917.....	193	
New Members since May, 1917	12	
		— 205
Resigned	6	
Died	4	
Lapsed	8	
		— 18

Net Membership, May 31, 1918	187
NEW PHILOSOPHY:	
Subscribers who are Members	184
Subscribers not Members	18
	— 202
Exchanges	14
Free copies (mostly to Libraries)	68
	— 82
	—
Total number of copies mailed	284

4. The Board of Directors reported that at a meeting held on May 23rd, 1917, it had elected officers for the year as published in the *NEW PHILOSOPHY* for July, 1917. That at a special meeting held on March 14, 1918, it was decided to limit the edition of the *Fibre* to the number of copies that could be printed on the paper already in hand. It was further reported that a meeting of the Board had been held on May 31, 1918, at which it had been agreed on motion that an edition of 500 copies of a translation of the *Posthumous Tracts*, including also the *Hieroglyphic Key* and the hitherto unpublished treatise on *Representations and Correspondences*, be authorized, and that paper not exceeding twenty cents a pound be purchased for the edition. Reports were also received from the Treasurer and from the Editor of the *NEW PHILOSOPHY* which it was agreed to present to the Annual Meeting. It was agreed on motion that \$2.00 credited to plates in the Treasurer's report be transferred to the credit of the general fund. It was suggested that a note calling attention to the cost of sending out second notices and receipts for dues and subscriptions be sent with the Treasurer's bills in order to encourage prompt payment and conserve as far as possible the limited funds of the Association. A report from Mr. Alfred H. Stroh was read and considered.

5. On motion the report of the Board of Directors was accepted and ordered to be placed on file.

6. The Treasurer's Report was presented as published on page 204. In connection with his report the Treasurer pointed

out that a considerable number of Swedenborg's philosophical works had been sold through the Association during the year, and that this number included seventeen different treatises.

7. On motion the Treasurer's report was received and ordered placed on file.

8. On motion it was agreed that the Chair appoint a Committee of one to audit the Treasurer's report, and that the Committee report to the Board of Directors. The Chair appointed Dr. F. A. Boericke as Auditor.

9. The Editor of the *NEW PHILOSOPHY* presented his Report. On motion it was agreed that the report be accepted and filed. See p. 201.

10. Messrs. E. E. Iungerich and Reginald W. Brown both rose to express appreciation for the amount of work done by the Editor of the *NEW PHILOSOPHY*, not only in preparing matter for the Association's journal, but also in editing and seeing through the press the very handsome editions of Swedenborg's works which have appeared under the imprint of the Association.

11. The Corresponding Secretary reported verbally that he had prepared a circular letter in connection with the last annual meeting of the Association, and that this letter had been sent to the various magazines of the Church. The Corresponding Secretary reported further that there seemed no particular need for the office of Corresponding Secretary.

12. On motion the report of the Corresponding Secretary was received.

13. On motion the office of Corresponding Secretary was dropped.

14. The Chair appointed Messrs. E. E. Iungerich, Geo. de Charms, and Theodore Pitcairn as a Nominating Committee to report as soon as they were ready.

15. On motion the Secretary presented the following summary of a report received from Mr. Alfred H. Stroh, from Upsala, Sweden, and dated March 5th, 1918.*

*This report, or a summary thereof, will appear in our October issue.

16. On motion the Secretary was instructed to write to the Secretary of the Royal Swedish Academy of Sciences, Professor C. Aurivillius, informing him of the fact that the Swedenborg Scientific Association had learned with much interest through Mr. Alfred H. Stroh that the Royal Academy proposed to resume the publication of its Swedenborg series *Opera de Rebus Naturalibus*; and the Swedenborg Scientific Association assembled at its Twenty-first Annual Meeting wishes to convey its appreciation of the undertaking of the Royal Swedish Academy, and at the same time its willingness to co-operate in any way within its power.

17. At this point in the program a paper by Dr. Frank W. Very was to have been presented, on "*The Luminiferous Ether—Its relation to the Electron and to a Universal Interstellar Medium.*" President Hite explained that the paper had been placed in his hands to bring to the meeting, but that unfortunately he had left Boston without it.

18. On motion it was agreed that Dr. Very's paper be referred to the incoming Board of Directors, and that the Board confer with Mr. Very in regard to the disposition of it.

19. The Nominating Committee reported the following Nominees: For *President*, Professor Lewis F. Hite, and for *Directors*, Dr. F. A. Boericke, Professors Reginald W. Brown, C. E. Doering, and Alfred Acton, and Messrs. B. A. Whittemore and Horace P. Chandler.

20. On motion the Secretary was instructed to cast a ballot for the nominees. The Secretary having cast the ballot the nominees were duly elected as the officers of the Association for the ensuing year.

21. Professor Eldred E. Iungerich read a paper on "*Loyalty to Swedenborg's Philosophy and Science.*" See p. 211.

22. Professor Reginald W. Brown presented an abstract of a paper on "*Problems involved in the Identification of Common Salt as understood by Swedenborg in His Chemistry.*" The paper is printed as a continuation of the studies now being published in the NEW PHILOSOPHY under the title of "Problems Relating to Swedenborg's Chemistry." See p. 222.

22. On motion the meeting adjourned at 5:15 to reconvene at 7:30 in the evening.

EVENING SESSION 7:30 P. M.

23. President Lewis F. Hite delivered the Annual Address, his subject being "Swedenborg's Science." The Address is published on page 205 of the present issue. The address was followed by a very interesting discussion in which a number of those present took part.

24. On motion the meeting adjourned at 10:30 p. m.

REGINALD W. BROWN,
Secretary.

REPORT

OF THE

EDITOR OF NEW PHILOSOPHY.

Since my last report four issues of the NEW PHILOSOPHY have been published. The total number of pages comprised in these issues is 132, as follows:

Transactions, including Addresses at Annual Meeting....	25
Editorials and Articles	54
Translations	53

132

The four issues reported at the last meeting of the Association comprised 152 pages, so that the present year's report shows a decrease of 20 pages. This is due to a policy,—announced in my last report,—which seemed necessitated by our financial condition, and in view of the heavy calls upon the treasury which will be made by the publication of the FIBRE,—the policy, namely, of including the Transactions in the regular pages of the journal instead of printing them as extra pages. Whether it will be necessary to continue this policy will depend on the resources of the ASSOCIATION; we hope we can

revert to our former practice, as it is important for the uses of our ASSOCIATION that we publish more translations of works by SWEDENBORG.

During the past year two books have been published by the Association, namely, *THE RETURN KINGDOM OF THE DIVINE PROCEEDING*, by Miss Beekman, and Swedenborg's work on *THE FIBRE*. The former of these works was published early in the year, and has had a successful sale.

The work on the *FIBRE* is now in the hands of the binder. With preface, anatomical quotations, and a very complete index this work makes a volume of 460 pages. It was originally printed in an edition of 1,500 copies, but in view of the shortage of paper on hand and the increase in the price of this same grade of paper, the Directors of the Association determined to print only such number of the final fascicles as could be obtained from the paper on hand. This number, it was found, is a little over 1,350 copies, and this, therefore, is the size of our edition.

The publication of this work constitutes a distinct and valuable contribution to the library of the student of Swedenborg; for, except to the Latin scholar, *THE FIBRE* has hitherto been a sealed book; and even to the Latinist the present publication with its restoration of the anatomical quotations, which are lost from the author's MS., and the complete index, will be found of great value.

It is to be hoped that steps will be taken to properly advertise the publications of the Association, and especially to bring them to the notice of librarians.

In my last report I noted that the preparation of title pages and indices for vols. 14-16 (1911-'13) and 17-19 (1914-'16) had been undertaken by Mr. Leonard Gyllenhaal. Subsequently owing to lack of time Mr. Gyllenhaal found it impossible to do this work, and since the indices were greatly desired, especially by librarians, I undertook their preparation myself. The title pages and indices were published in the January *NEW PHILOSOPHY*. Unfortunately, owing to a mistake by the printer, they were not printed in separate fascicles; the printer, however, is remedying the error by printing 250

copies of the two indices in separate fascicles, and at his own expense. These will be supplied free to all subscribers applying for them.

In April last an arrangement was made with the *NEW CHURCH MESSENGER* whereby that journal will be advertised in the *NEW PHILOSOPHY* in return for the advertisement of the *NEW PHILOSOPHY* in the *MESSENGER*. As the latter journal is a weekly, this arrangement is a most generous one, and the thanks of the *ASSOCIATION* are due to the publisher of the *MESSENGER*, the Rev. John S. Saul, for this kind co-operation in our work. Our advertisement has already appeared in several issues of the *MESSENGER*, and we expect soon to receive copy from Mr. Saul for the advertisement of the *MESSENGER* in the *NEW PHILOSOPHY*.

The translations that have appeared this year have been a continuation of those small physiological and psychological writings by Swedenborg, which are commonly known as *POSTHUMOUS TRACTS*. This series will be concluded during the coming year. We then propose to publish these tracts, together with the Hieroglyphic Key and the hitherto untranscribed and unpublished Doctrine of Correspondences and Representations as a single volume under some suitable title, and probably as a part of the *ECONOMY OF THE ANIMAL KINGDOM* series.

In the *NEW PHILOSOPHY* itself it is my present purpose to next publish Swedenborg's first draft of volume II of the *ECONOMY OF THE ANIMAL KINGDOM*. The MS. of this draft has been photolithographed, but the work has never as yet been transcribed or translated. A brief examination of its contents indicates that there is here much valuable material not included in the published work, and which will prove to be a rich contribution to the understanding of Swedenborg's philosophy.

I should be glad, however, to consider any suggestions looking to the translation of some other of Swedenborg's works in place of this draft.

Respectfully submitted,

May 30, '18.

ALFRED ACTON.

TREASURER'S REPORT

FOR THE YEAR ENDING MAY 31, 1918.

RECEIPTS.

Dues	\$177.00	
Subscriptions to NEW PHILOSOPHY.	99.52	
Sale of S. S. A. Publications	111.35	
Sale of other Pub. to Members of S. S. A.	30.48	
Contributions	396.00	
		\$814.35
Balance on hand, May 23, 1917.		112.39
		\$926.74

EXPENDITURES.

Printing 3 issues NEW PHILOSOPHY, Jan., April, and July, 1916.	\$108.39	
Paper for 4 issues, July, 1917-April, 1918	21.00	
Plates for Fibre	13.25	
Editorial Expenses	20.75	
Expenses Binding Return Kingdom, freight, etc	34.30	
Sundries: Stationery, postage, addressing Env., freight, and cartage	32.44	
Pd. to Publishers for books for members	25.31	
		\$255.44
Balance, May 31, 1918.		671.30
		926.74
Includes Royal Academy Pub.	\$10.00	
Plate	2.00	
		\$12.00
Dues unpaid, 1918	51.00	
Subscriptions unpaid, 1918.	34.50	
Dues unpaid, 1917	17.00	
Subscriptions unpaid, 1917	10.50	

Dues unpaid, 1916	7.00
Subscriptions unpaid, 1916	4.00

57 persons owe dues and subscriptions amounting to 124.00

Respectfully submitted;

C. E. DOERING,
Treasurer.

ANNUAL ADDRESS

TO THE

SWEDENBORG'S SCIENTIFIC ASSOCIATION.

BY LEWIS FIELD HITE, PRESIDENT,

SWEDENBORG'S SCIENCE.

The study and exposition of Swedenborg's Science is one of the natural and avowed objects of the SWEDENBORG SCIENTIFIC ASSOCIATION. This work is no less important than it was a century and a half ago, when the learned world had little more than vague rumors of Swedenborg's scientific achievements. Since then conditions have changed for the better. The Royal Swedish Academy of Sciences acting through a special committee has undertaken to edit and publish the whole body of his scientific works, and the early volumes have already appeared. Here we have a signal instance of long delayed recognition. This extraordinary recognition taken together with the important testimony to Swedenborg's achievements brought forward at the international Swedenborg Congress in 1910 should awaken among scholars deeper interest in him and a fuller appreciation of his scientific worth; it should make really deep scientific students more accessible to us in our efforts to extend a knowledge of this unique body of scientific writings.

It would be presumptuous in a brief address like this to un-

dertake even a meagre summary of Swedenborg's contributions to scientific thought. It is familiar history that he covered with a masterful grasp the whole field of then known science. In geology, metallurgy, chemistry, physics, physiology, psychology, he labored systematically with an originality of method and insight that brought him unparalleled results.

But it is not in these special and technical fields that I propose to follow him. In the course of time this will be done by educated specialists. I have in mind to attempt a rough sketch of what seems to me to be the central feature and the main direction of all his scientific and philosophical thought.

Swedenborg's systematic exposition of his scientific and philosophical views was begun in "The Principia." After an immense amount of preliminary investigation, he brought his results into a sort of tentative form in what is known as "The Lesser Principia," which is an admirable and important forecast of his future labors upon the constitution and the constituents of the elemental world. A natural extension of these studies brought him into the field of physiology, and especially to the problem of psycho-physics, the relation of man not only to his body, but through his body to the elemental world outside.

As is well known, Swedenborg sketched in the introductory chapter of "The Principia" what may be called his doctrine of "Man in his Integrity." The situation there presented exhibits in principle and in substance not merely the end but the order of proceeding of all his science and philosophy; it gives us a prophetic insight into his view of man's place in the universe. The philosopher in this picture is the man who has recovered his integrity through education, who, as a result, is in such complete harmony with his environment, both within and without, that he is immediately responsive to and comprehensive of the whole world in which he finds himself the center, and of which he remains the center until he discovers the real center.

We may remark in passing that Swedenborg's own educa-

tion exemplified with astonishing completeness the ideal here set forth.

The Principia studies led to or culminated in the work "On the Infinite," which was concerned mainly with the nexus between the Infinite and the finite. The same problem was presented in epitome by the question of the intercourse between the soul and the body, the problem which was central in all his subsequent scientific and philosophical interests. In fact Swedenborg's science proceeded on three levels. Religious and psychological interests dominated his efforts from the beginning. The work of "The Principia" period was preliminary, and laid the basis in the elemental world for his physiological studies. These at first, as in the "Economy of the Animal Kingdom," were characteristically psycho-physical, as is evident in the "Introduction to Rational Psychology" and in the chapter on the soul. In the "Rational Psychology" itself psycho-physics gave way in a measure to pure psychology.

It seems, however, that the physiological studies of the Economy period proved to be inadequate for his systematic purpose to establish in physiology a firm and sufficient basis for his Psychology. He, therefore, began anew his physiological labors and produced those minute and monumental works, "The Animal Kingdom" and especially "The Brain."

In this course from beginning to end, we watch him at work on the three levels; he set forth his studies of the physical elements, both inside and outside the body; he considered in immense detail the physiological constituents of the body; and finally, the psychological constitution of man. In all this, there was one steady picture before his mind, namely, man as a microcosm, in which the elemental, the physiological, and the psychological worlds were combined; the elements, the membranes, the tissues, with their several motions and vibrations, together with the fluids and, highest of all, the animal spirit, as the vehicle of intelligence; all these constituted the whole man, and these when brought into harmony and order gave us the complete result, the man in his integrity.

I propose, therefore, in this paper to begin with "The Principia" sketch of Man in his Integrity, and show that the whole

drift and outcome of Swedenborg's science and philosophy are developments of this situation.

In brief, the doctrine is, that if the mind (*animus*) be well connected with the organs of sense, then man is rational. For in that case there is a proper intermediary between soul and body, so that the senses may exercise their perception from the soul, and the soul its perception from the senses. In this relation between soul and body, there is another form of intermediary, the rational mind, or the rational function of the soul, which receives and interprets all that comes from the animal mind and the senses below. When this pathway from body to soul and from soul to body, through these two intermediaries, is unobstructed and clear, the soul is fully informed of all that takes place throughout the course. It is the further character of this pathway that now interests us.

We are approaching a more intimate acquaintance with man in his integrity, and we have before us the problem of how this man perceives and knows all that happens in the world around him. Here we must consider briefly the composition and constitution of man, according to the doctrine, as a psychophysical organism, as a body-mind-soul system.

First of all, we have the *Principia* doctrine of the elements and of the elemental world. On the basis of this doctrine, we are enabled to affirm the consubstantiality of man and the outside world, especially elemental consubstantiality. For instance, the three elements air, ether, aura, are pervasive atmospheres that surround and penetrate the human organism, bringing to it and carrying into it their own proper forces and motions. But further than this, these elements actually form, or assist in forming, and in a measure constitute, the tissues and organs, internal and external, of the body. The continuity of the elemental world outside the body with the elements inside the body furnishes the conditions for the transfer of the movements in the outer world to the highest and innermost centers of the human organism. In this way, the happenings in the outer world are transmitted to the Soul with their complete original characters. Thus man in his integrity is so constituted that he is the center and recipient of all elemental ac-

tion from without; and his Soul is directly aware of the operations of Nature at large.

This is a very simple reproduction of Swedenborg's picture of man in his integrity, as given in the introductory chapter of "The Principia." In a word, the situation here is that man is thought of as a microcosm in which all the characters, forces, and materials, of the macrocosm are centered and concentrated. The conception is as yet obviously and firmly mechanical. The physical elements play the leading role; the bodily structures and tissues are the reactive agents of the elemental forces; even the mind, animal and rational, is conceived in terms of mechanical processes; the Soul alone in the quality of intelligence appears in its proper spiritual character.

In "The Economy of the Animal Kingdom" the picture is developed in detail, but the outlines remain the same. The attention shifts from the elemental to the physiological world, and the physiological conditions of the Soul's activity in the body are examined and set forth with unexampled completeness. Certain new and far-reaching principles of method are formulated and brought into use. The fact of contiguity recognized in "The Principia" as characteristic of the operations in the psycho-physical system, is combined with the fact of composition and recomposition to form the ground-work of the doctrine of degrees. The "elements" of "The Principia" are taken up into the doctrine of series and made constituents of the physiological structure. What is called in "The Principia" the most subtle, active principle reappears here as the most simple substance, the animal spirit, the primary physiological entity. With the animal spirit, various physiological series begin. These series are connected with the elemental series; the animal spirit with the aura, the white blood with the ether, the red blood with the air. The nature of this connection Swedenborg submitted to elaborate investigation and discussion, a discussion which is in substance only an enlargement of the Principia picture, a more explicit development of the features and the conditions of man in his integrity.

The central theme at this stage, the Economy stage, is the

animal spirit, its dependence upon the refined and exalted aura of the elemental world, and its all pervasive and generative operations in the lower constituents and functions of the body. Swedenborg's conception of the aura and the animal spirit, complex and difficult, is a unitary conception which serves to bring together in the deepest intimacy the physical and the physiological worlds. The aura is universal in the physical realm, as the animal spirit is universal in the physiological. Furthermore, the aura is the formative constituent of the animal spirit, as ether is a formative constituent of the white blood, and air a formative constituent of the red blood. The animal spirit is the first term and the primary constituent of the animal series, the multitudinous series which make up the animal body; as the aura is the first term and the primary constituent of all physical series. So that a knowledge of these two entities, each primary in its own series, and of their successive processes of composition and recomposition, involves a complete knowledge of the entire physical and physiological realms. Accordingly, Swedenborg says the animal spirit reigns in the universals and in the particulars of the body, and for this reason he calls the body "*regnum animale*," the animal kingdom, really the kingdom of the soul.

So far Swedenborg's science has conducted us into the fields of physics and physiology, but the distinguishing characteristic of man in his integrity is knowledge, intelligence, and wisdom. It is true that the operations of the animal, and even of the rational mind, are in this period conceived and described in terms of a mechanical theory, but the soul itself has been kept apart and above the mechanical operations of the psychophysical system by its function of intelligence which by deliberate contrast with mechanical functions is conceived as distinctly psychological or spiritual. The interest now passes to the psychological aspect of man in his integrity, and we take our clue from the nature and functions of the animal spirit.

The animal spirit, an ambiguous and difficult conception, is the soul of the body rather than the soul of the mind. Swedenborg labored persistently over this ambiguity in the chapter on the soul in the *Economy*, but he did not, it seems to me,

finally extricate himself from its perplexities until he reached the doctrine of the pure intellect in his "Rational Psychology." In spite of the mechanistic psycho-physics of this treatise, Swedenborg here entered the distinctive realm of psychology, and here his natural science culminated, his systematic scientific labors attained completion. For then came his spiritual illumination, and his intromission into the spiritual world gave him the point of view and the position of Seer and reporter. Thenceforth his work was that of interpreter of spiritual life. In the light of his spiritual illumination, he formulated his all important doctrine of love, which has given philosophy its new point of view and its new insight.

To sum up, Swedenborg's science is the science of man, of his anatomy, his physiology, his psycho-physical constitution, of his moral, intellectual, and spiritual constitution. This whole body of science develops out of the situation presented to us by the doctrine as to man in his integrity. This doctrine anticipates many important features of the later doctrine. For example, there is a striking parallel between the description of man in his integrity and that of the celestial man of Eden. So, too, the formula for the mutual relation and intercourse between the soul and the senses, that the senses exercise their perception from the soul and the soul its perception from the senses, is a forecast of the process of glorification and of the relation between the Divine and the Human in the Lord.

His study of man led Swedenborg to a view of man's place in the universe, and the universe became more and more to him of the nature of man.

LOYALTY TO SWEDENBORG'S PHILOSOPHY AND SCIENCE.

BY E. E. IUNGERICH.

In no. 20 of the *INTERCOURSE OF THE SOUL AND BODY*, published near the close of Swedenborg's life on earth, SWEDENBORG, speaking of the need that spiritual truths shall rest on natural truths as a basis, cites as an illustrative example the common practice of giving theological candidates a prelimi-

nary training in philosophy as an asset without which they would be lacking in intelligence, and refers to his own investigations in the realm of natural truths as a pre-essential step to his becoming subsequently the revelator of spiritual truths set forth rationally. Had this not been, in fact, the case with him, he would not have seen the temple of wisdom whose "arcana of faith may now be penetrated INTELLECTUALLY," T. C. R. 508, nor ever made it accessible to such Newchurchmen as will be solicitous to acquire a preliminary philosophical training in order to be intelligent and rational in their acceptance of the spiritual truths of the New Church.

It is a legitimate deduction from this teaching of the work on the INTERCOURSE OF THE SOUL AND BODY, to conclude that the various writings penned by Swedenborg during the course of his training as a philosopher must be themselves that philosophy which is to train the mind to receive intelligently and rationally the spiritual truths he communicated when from philosopher he became revelator. If this were not so, all hope of a true philosophy would be vain.

ON THE ONE SIDE, the sporadic philosophical and scientific statements that are to be found in the Theological Writings as illustrations of their spiritual truths, if taken apart from the Scientific Works, stand only as dogmatic utterances deprived of rational extension, or, as seeds withheld from the congenial soil in which they would grow to fructification. To serve in the exploitation of a true philosophy and science they need to be seen in the setting of the Scientific Works from which they were culled and in which they terminate. In their relation to the spiritual truths they illustrate, these fragmentary, sparse, philosophical and scientific statements in the Theological Works feed a religious man's spiritual love in the natural (*A. E.* 1171), and satisfy his craving to see in nature some illustrations of his theological belief. But when taken conjointly with their setting in the Scientific Works they can be of aid in the discernment and further enhancement of a true philosophy by appealing to the natural love from the spiritual that every laborer in a subordinate field of knowledge must have if he is to develop it as a structural whole. A subordinate

field cannot be developed by dictatorship from a higher field, nor by one who in the higher field is prone to mangle the lower field ruthlessly in order to extract from it a few gems to illustrate entities in the higher field.

ON THE OTHER SIDE, no true philosophy can possibly be got from the world on any subject whatsoever; for, as the Writings uniformly stress, nothing is to be hoped for from a source in which there is no knowledge of discrete degrees and therefore none of any true cause-and-effect relationships, in which the reasoning proceeds from the dust of facts and terms without ever getting to true principles, and in which "sight from the eye has closed the understanding." (*S. D.* 767, 1603.) A true philosophy is the handmaid of revelation, and it is hence only the output during Swedenborg's course of philosophical preparation that can serve in this relation to his output during his career as revelator. If allowed so to serve, and not disparaged or laid aside as a mere intellectual curiosity, a glorious future unfolds itself. Not only through these Scientific Works can lines of philosophic contact be established with those wise ancients who reasoned deductively from true principles and did not start from a blinding dust as do the moderns, but there is hope through this New Church philosophy to see the constantly accumulating dry bones of scientific facts gradually knit together, then take on sinews, and, finally, rise as a mighty hero to shout acknowledgment of the Lord; and no longer moulder cadaverously in a Tophet or Gehenna as meet basis for the influx that denies God and would dismember His kingdom.

This legitimate deduction that Swedenborg's scientific output must be the indispensable highway from Egypt through Assyria that will be trodden in the irresistible trend of events leading to Canaan's becoming "a third in the land," amounts to a certainty in the light of other testimony. In his letter to the prelate, OETINGER, for instance, SWEDENBORG strongly asseverates the Divine Guidance that controlled him between the years 1710 and 1744, or when he wrote all the works subsequent to his *SELECTÆ SENTENTIÆ* and ending with the *WORSHIP AND LOVE OF GOD*. During all this period, he says: "I

was introduced by the Lord into the natural sciences, and given, moreover, by Him to love truths in a spiritual manner . . . and thus to see them from the Lord." (2 *Doc.* 257.) Again, in the *ADVERSARIA*, while decrying the inductive method of reasoning as one leading to inevitable obscurity and failure, albeit maintaining that he alone had been able to travel this perilous path, he then adds significantly: "but I would quickly have fallen backwards, unless by the Divine mercy of the Lord I had instantly been led back into the way." (II. 1281, 1282.) How he was "led back into the way" is illustrated in the *SPIRITUAL DIARY* by the declaration that once when infested by the idea of infinite space he "was led by the Lord into some perception of forms, the notion of which far exceeds . . . the notions received from geometry." (*S. D.* 3482.) Again, while writing his brief *HISTORY OF CREATION* he records his wonderment over the agreement between his revealed understanding of the Genesis account of creation, and that in his *WORSHIP AND LOVE OF GOD*, which he had supposed written merely according to the thread of human reason and therefore not necessarily trustworthy. But on two separate occasions he was informed by a living voice that this scientific work had been "written and dictated by the Son of God" (see the unpublished fragments at the end of *W. L. G.* in VII. Photo:91) and was verily a "Divine Book" (2 *Doc. concerning Swedenborg*, 209. Note here also the interesting teaching of *Arcana Celestia* 3399, that only the celestial can perceive rational truth to be divine; whereas the spiritual think that if truth were rational it could not be divine, and that if it were divine it would have nothing in common with the rational.) Anyone acquainted with the *WORSHIP AND LOVE OF GOD* will recognize it as a fruition of the *PRINCIPIA* to which it frequently refers, and as being that treatise on Worship which he promises in the *INFINITE*. In fact, Swedenborg instinctively associated the two together, for he asked the voice which declared the *WORSHIP AND LOVE OF GOD* to be a "Divine Book," whether this was not also the case with the *INFINITE*. (2 *Doc.* 209.) Again, in the *FIVE SENSES*, he writes: "*It is to be observed* that according to an admonition of the night-

time I must refer to my philosophical PRINCIPIA and consider the levity, gravity, and activity inscribed on the pure: and I was told that thus it would be granted to me to fly wherever I please" (no. 262). Finally, as further evidence of the Divine guidance during the philosophical period of Swedenborg's life, we note the occasional bright lights (*S. D.* 2951, 3 *Adv.* 7012), which corroborated the truth of what he wrote. Some such phenomenon had occurred also with the wise ancients, and in the case of Aristotle, a Pallas appeared and stroked his cheek whenever he had produced anything signally valuable (*S. D.* 3952.) I stress as especially significant, that after concluding the CORPUSCULAR PHILOSOPHY, a brief summary of his cosmology, which (like the ECONOMY's theory of the blood corpuscle) involves principles and structural forms enunciated as early as his CHEMISTRY, Swedenborg should then have set his seal to it in the impressive words: "*These things are true because I have the sign.*"

If the Theological Writings are the standard, touchstone, and final court of appeal, in the realm of revealed spiritual truths,—and the evidence to this rests on declarations that they are the very voice of the Lord,—so the Scientific Works occupy a not unlike position in the domain of that other foundation of truth, viz., that from nature (*S. D.* 5709),—and this on the evidence just cited, that from 1710-44 Swedenborg, by Divine Guidance, was kept in the way, inspired with a love of truth for its own sake, given to see truths from the Lord, and often apprised by supernatural signs of the verity of what he had written.

But a touchstone or standard, to remain such in actuality, needs the support of a loyal and unequivocal affirmation of adherence that does not deny in one breath what it affirms with another, nor limit its usefulness to universal principles, while denying its validity in singulars. Moreover, though the Theological Writings are a repository of spiritual truths expressed *rationaly*; and the Scientific Works, a handmaid of *rational* formulations of philosophy and science whose purpose will be that of molding the mind into seeing unities and harmonies in man and the universe, it does not follow that any mind,

under the plea of a license to act as it pleases according to its own limited *rationality*, is authorized to stand in judgment as a tribunal over the latter, any more than it should do so over the former.

There are, however, statements in both sets of works that might be taken to imply the supremacy of human reason, or of some other standard than either set. Take, for instance, in the Theological Works, the oft repeated maxim that an adult should compare the doctrines he was taught in his youth, with the Word,—and should reject of them whatever he found to be in disagreement. To a Newchurchman who denies the appellation “Word” to these Theological Works, this would logically lead to the absurd obligation of having to compare them with some former revelation to which he will allow that appellation, with the result that he would measure a source of light in the domain of spiritual truths by that which is dark and enigmatic there. A not unlike somersault in the domain of nature’s truths, as the result of a similar reliance on infirm reason and a similar slighting of the source of light there, would occur if we took the maxim that a true philosopher will cultivate experience, geometry, and reason, as an invitation to turn the critical acid of our limited rationality upon the Scientific Works in order to determine how much of them must be rejected as conflicting with a supposedly more advanced experience, geometry, and reason. One tutored in the Scientific Works, but not having a loyal affirmation of them as a reliable touchstone, could be prone to surrender whatever in their statements did not square with phenomenal observations in nature, and so again measure a source of light by what is dark, enigmatic, and dismembered. Swedenborg, who enjoined the cultivation of experience, geometry, and reason, did not himself neglect to use them; and his Scientific Works are an example of the intelligent use of these three means to acquire a true philosophy.

Let us suppose we had among us to-day a genius in science and philosophy similar to Swedenborg, versed in all the facts and theories of this day and, at the same time, maintained in the way of truth by a Divine Guidance inspiring him with a

love of truth for its own sake, and with the ability to see truth from the Lord. Is it likely that the works such a man would write would not be challenged two centuries hence as being supposedly limited and injured by notions peculiar to the science of to-day, but no longer tenable on account of facts brought to light two centuries hence? No infallible standard or touchstone for science that would endure as such to eternity could ever be composed, if we should require of it that its statements of fact must be taken in the most obviously literal way possible and appraised solely by the state of scientific thought at the time of its composition. Its ultimate imagery and setting are couched of necessity in the appearances of truth prevalent in the world at the time of its composition; but if there was a Divine Guidance in its composition, there is a reasonable hope that such appearances of truth are providentially susceptible of an elastic construction that will permit them to mirror whatever further developments in scientifics the coming ages may bring.

In this, the case is not unlike that of a standard in the domain of revelation, which also rests on appearances of truth common to the age of its composition, but containing, nevertheless, a genuine ultimate sense which will appear more and more clearly as the coming ages unroll the appearances.

Granted that it was prevalent in Swedenborg's day to consider air as a uniform compound, crocodiles as having poison-sacs, salt as yielding water upon decrepitation, swallows as hibernating under water, and the age of the world as being only 6,000 years; and that Swedenborg simply supposed such beliefs to be the truth, and wrote in agreement therewith: it does not therefore follow that the discovery of these and similar statements in his Scientific Works must merely evoke in our minds the idea of the errors of his age, and that they may not be capable of a flexible construction, itself unknown to Swedenborg and his age, but yet contemplated by Providence when it led Swedenborg to select them as external cloaks to the eternally true philosophic principles they invest. The fact that Swedenborg and his age may have understood them in their most obviously literal sense is no proof that Provi-

dence may not have intended their genuine literal sense to be quite otherwise.

To illustrate what I mean by a flexible construction, take the statement in the Genesis account of creation,—that God made man out of the dust of the earth. An insistent Christian literalist might be conceived as declaring that God either made man by a direct molding of the literally understood dirt or soil, or else that this statement is scientifically erroneous. But not so Swedenborg in his HISTORY OF CREATION. There he interprets the statement flexibly and he sees, as involved in it, the mode by which the vegetable kingdom worked on the soil to elaborate those delicate seeds from which the first parents of the human race were born, as is set forth in the WORSHIP AND LOVE OF GOD. In this flexible rendering of a literal statement of science, I hold that Swedenborg sets us an example how to proceed when we meet with statements in his own Scientific Works that no longer seem to tally with developments in modern science.

If it is a matter of scientific honesty to chronicle discrepancies between the literal statements of the Scientific Works and facts of modern science, and even an occupation that will furnish data useful to those who have not lost their trust in this touchstone for nature's truths; it is far more important that we should cultivate a habit of philosophizing. Especially in relation to the problems in Swedenborg science do we need this intermediate between the mere cataloguing of difficulties on the one hand, and our just hope, based on the *a priori* grounds already cited, that Swedenborg was probably right in any case. These *a priori* grounds will only give us a hope, but they will not establish rationally *how* Swedenborg was right. But the mere cataloguing of difficulties, at best, only presents the components that must be pieced together. We need to formulate theories to bridge the difficulties, and then to test out the theories in many ways. Rarely is a first theory absolutely correct. But if we will venture bravely and moderately in our reasoning, we may be given to see the genuine truth involved in these problems.

There is a notion abroad that rationality in such problems

consists in coming to the conclusion that because we find discrepancies we must judge Swedenborg to be in error and leave the matter at that. But we need to cultivate on these points a spiritual rationality that will ponder, philosophize, and build theories to reconcile the discrepancies. We are not free to disparage, nor rational in opposing the conclusions of one who was introduced by the Lord Himself into the natural sciences from 1710-1744, inspired with a love of truth for its own sake, kept from falling backwards, and so brought to establish a colossal foundation to the subsequent crowning revelation.

For the purpose of illustration let us now consider a number of points in which Swedenborg has been supposed to be in error, and see whether theories to show he was right may not suggest themselves. I will confine myself to several problems in his CHEMISTRY, inasmuch as some who hold to the validity of what was written after the PRINCIPIA in 1734 are willing to yield as untenable points in works prior to that time.

I. THE COMPRESSION OF AIR TO WATER.

It was apparently Swedenborg's belief that the air, whose compression produced water (to-day known to be one part oxygen to two parts hydrogen), was the common air which men habitually breathe. It has been proved, however, that air is not a uniform compound, but a mixture of two main gases, oxygen and nitrogen, that vary slightly in their proportions to each other at different parts of the earth's surface and at different elevations. At first sight, it looks as if we are being asked to believe that the compression of a fluctuating mixture of oxygen and nitrogen would be expected to yield a liquid composed of oxygen and hydrogen in a fixed proportion. But a flexible interpretation would look beyond Swedenborg's own thought in the matter and proceed somewhat as follows: It would begin by assuming that the original air in creation was a uniform compound consisting of substances whose compression together did produce water, but would suggest as a hypothesis that *the whole body of this primitive air was probably converted entirely into water*. The present air would be regarded as having arisen later, and only when magnetic aura bullæ bubbled out from the disintegrations at the bottom of

the primeval ocean and rose surrounded with crusts of those subtle salt crystals we call oxygen and nitrogen. Plausibility is given to this line of reasoning when we consider that these gases obey the same laws of expansion and contraction under heat and pressure, and that this may be regarded as due to the elasticity of their interior content of magnetic aura which is the same in either gas. But Swedenborg himself gives warrant for the belief in an air created subsequent to the water, when in the HISTORY OF CREATION he designates the firmament that "divided the waters from the waters" as being the air which intervenes between the ether and the water; and also when in the WORSHIP AND LOVE OF GOD he first speaks of our earth in no. 12 as "an uncovered wave," and subsequently in no. 13, speaks of the creation of "a new and mediating atmosphere," the air.

II. THE THREE DIFFERENT DIAGRAMS OF THE WATER-PARTICLE.

As PROF. R. W. BROWN has reproduced in the NEW PHILOSOPHY for April, 1918, the three diagrams representing Swedenborg's concepts of 1721, 1728, and 1734, of the water particle, as set forth respectively in the CHEMISTRY, LESSER PRINCIPIA, and PRINCIPIA, I need only refer the reader to that issue. Though the three diagrams are different, I yet see no virtual disagreement; but only such a difference as one might expect to find in a painting that is first seen as a mere outline; then, later, when further advanced; and, finally, when completed. The CHEMISTRY diagram of 1721 meant to teach merely that the water particle was spherical, and that half of its volume was occupied by what was relatively weightless. This was quite sufficient for Swedenborg's purpose, namely, to compute the relations by weight and volume of the various structural figures considered in the CHEMISTRY. Swedenborg, as an intelligent reasoner, only presented those features of the water-particles that were necessary for the purpose in hand. It is of little value whether he was acquainted with details of the water-particles presented later, though he probably was not. It was sufficient that he knew then the details needed for the reasoning in the CHEMISTRY.

In the LESSER PRINCIPIA we find a more developed diagram,

whose purport is to show the genesis of the water particle, and not so much its weight relationships. The *PRINCIPIA* gives the water-particle a most finished diagram which, in my opinion, illustrates several other properties; as, for instance, its resiliency to compression, by showing the contacts of its constituents all the way to the center. Its being composed of two different constituents,—solid fifth-finite kernels in the crust, and minute bullæ with fifth-finite surfaces,—suggests the possibility of correlating these respectively with oxygen and hydrogen.

I cannot see that either of these two diagrams violates the requirement of the *CHEMISTRY* that half the volume be occupied by a relatively weightless substance.

III. TWO PROBLEMS FROM THE STRUCTURAL POSITIONS OF THE WATER-PARTICLES.

It looks as if Swedenborg, because of using approximate values for some of his multipliers, had failed to notice that two positions he describes in the second chapter of the *CHEMISTRY*, the fixed triangular and the fixed quadrilateral, were identical. Another arrangement, the triangular position of the third kind, is impossible for incompressible perfect spheres.

We must remember, however, that Swedenborg, though calculating, for the sake of simplifying the mathematics, from the dimensions of perfect spheres; yet had in view globules that were deeply corrugated, and which were in a situation to be compressed and disintegrated. In the first case; if cogged or corrugated spheres be fitted with their cogs interlacing, I feel sure the fixed quadrilateral and fixed triangular positions can be shown to be not identical. In the case of the triangular positions of the third kind; a similar arrangement of cogged spheres plus a degree of compressing disintegration will perhaps satisfy the mathematical proportions calculated by Swedenborg.

Swedenborg frequently commented on the superabundance of the facts of experience available in his day, and voiced the need of labors to organize them. As a result of his own providentially guided efforts in this direction we have as a guerdon the most wonderful system of natural truth that has ever been

given to mankind. Though some facts of experience common to his day may come in time to be questioned as a result of an ampler experience; his statements about them will yet retain a value as appearances of truth that actually contain the genuine truth on the matter. That we may train our gaze to look for the genuine truth within such appearances it behooves us to lift it out of the dust of facts and to cultivate a philosophic as well as a scientific temper; and above all not to lose hope that some day "the Lord will provide" (Motto to the PRINCIPIA) that the genuine truths in these statements shall be seen.

PROBLEMS RELATING TO SWEDENBORG'S CHEMISTRY.

BY PROFESSOR REGINALD W. BROWN.

INACCURACY OF SWEDENBORG'S CALCULATIONS.

The CHEMISTRY bears many evidences of being put into print rather hurriedly without a thorough checking up and revision. This is most strikingly illustrated in its mathematical calculations and in the conclusions based upon them. The main source of trouble in connection with these calculations is that they are not worked out accurately, approximate values taken in the solution of the steps result in the piling up of errors leading to very inconsistent conclusions.

As an instance of such inconsistent conclusions in treating of the *Different Positions of Round Particles* in Part VIII, Swedenborg's inaccurate calculations failed to reveal the fact that two of his positions, namely, the "fixed triangular pyramidal," the "fixed quadrilateral pyramidal" are identical, as would have appeared if the calculations had been exact, or if Swedenborg had actually tested out his theoretical positions with models of round particles. Such a test would have shown that another of the positions described, namely, the "triangular position of the third kind" is mathematically impossible.

In calculating the portion of the total volume which corresponds to each spherical particle in the positions or pilings referred to, Swedenborg develops the following equations:

- a. For the fixed triangular pyramidal position.

$$2d \times \frac{7d}{4} \times \frac{23d}{14} = \frac{23d^3}{4} = [5.75d^3].$$

- b. For the fixed quadrilateral pyramidal positions,

$$2d \times 2d \times \frac{7d}{5} = \frac{28d^3}{5} = [5.6d^3].$$

- c. And for the so-called "triangular position of the third kind,"

$$\frac{7d}{4} \times \frac{7d}{4} \times \frac{7d}{4} = \frac{343d^3}{64} [5.359d^3].$$

In the case of (a) and (b) the equations are built up on correct geometrical conceptions, but calculated accurately, the equations ought to be as follows:

$$\text{For (a)} \quad 2d \times \sqrt{3d} \times \frac{2\sqrt{6d}}{3} = 5.6568d^3,$$

$$\text{For (b)} \quad 2d \times 2d \times \sqrt{2d} = 5.6568d^3.$$

The two positions are, therefore, identical, as may also be seen by piling spheres in the manner described. In the case of (a) the approximation $\frac{7}{4}$ for $\sqrt{3}$ introduces a value 1% too large, and the approximation $\frac{2\sqrt{3}}{3}$ for $\frac{2}{3}\sqrt{6}$ produces a value about 0.6% too large, which accounts for the value 5.75, which is about 1.6% in excess of the value 5.6568.

In the case of (b) the approximation $\frac{7}{4}$ for $\sqrt{2}$ introduces a value of 1% less than the correct value, which accounts for the value 5.6, which is 1% smaller than 5.6568.

The total difference in the results due to approximation is actually only 2.6%, and upon careful scrutiny might have suggested the fact that the two positions were the same, had it not been that they were looked at from different points of view, and calculated on a different basis.

Inconsistency of so-called "triangular position of the third kind."

The lack of careful checking up of the calculations appears very clearly in what Swedenborg says of this position. The most compact position in which round particles can be piled or packed without destroying their sphericity is that described by Swedenborg as the "fixed triangular pyramidal"

assumed under "the greatest incumbent weight"* or as the "fixed quadrilateral pyramidal" assumed under "the highest pressure."† However, in what is described as the "triangular position of the third kind"‡ a much more compact position than the *most compact possible* is implied, in which the space occupied by the round particles would be as the total volume 4.1937 to 5.196, instead of 4.1937 to 5.6568, making the total volume of the so-called "triangular position of the third kind" over 8% smaller than the most compact position possible. Since Swedenborg uses the approximation $\frac{7}{4}$ for $\sqrt{3}$ the discrepancy amounts to 3% less.

Our analysis of the so-called "triangular position of the third kind" is of minor importance, as this position is not referred to again, and is not involved in the chemical theories which follow in the CHEMISTRY. It merely serves to illustrate the looseness of Swedenborg's method of calculation. The case is quite different in regard to the "fixed quadrilateral pyramidal" and the "fixed triangular pyramidal" positions which we have shown to be identical. Swedenborg supposed the former to be the position of the water particles involved in the formation and crystallization of common salt;** and the latter to be the position of the water particles involved in the crystallization of nitre or saltpeter.*† It is evident that Swedenborg assumed that these were two distinct positions in which spherical particles could be arranged in contact. The position as described in the theory of common salt is the correct one, but conditions which are assumed to exist in the description of the crystallization of niter are impossible, as may be seen readily by actual experimentation. The misconception in the case of the "fixed triangular pyramidal position," therefore, affects materially the whole theory in regard to niter.

The wide discrepancy in the case of the relative volume of the tetrahedrons or "acid particles" and of the "cubes."

The most far-reaching difficulty with Swedenborg's calculations results from the, to all appearance, arbitrary ratio which

*CHEM. p. 11, sec. 5. †Ib. p. 12, sec. 7. ‡Ib. p. 10, sec. 4.

**Ib. XI:I, and 3¹¹, respectively.

*†Ib. XIII:5 (p. 97, Strutt).

he adopts for the relative sizes and masses of the "acids" and "cubes," the fundamental units of his chemical system. This ratio affects all the calculations which Swedenborg makes in regard to the masses and densities of the substances of which he treats. Without any calculation or explanation Swedenborg simply makes the assumption that the volume of the tetrahedral space is to the volume of the cubic space as 1 to 2. He states that in the case of the combination of "one cube with two triangles" the "two triangles occupy half the space, and the cube takes up the other half." (CHEM. X: sec. 4².) Calculation shows that the ratio of the triangular space to the cubical space, instead of being 1 to 2, should be less than 1 to 5 under the conditions which Swedenborg postulates.

It is true in accordance with Part XIV, sec. 1, of the Chemistry, that the cubic particle might lose eight so-called "ramenta," and the tetrahedral acid only four. Further, if we supposed each ramentum abraded from the acid to be one-eighth the volume of the acid particle as originally formed, a proportion which seems justified by Plate XI, Fig. 2, and each ramentum abraded from the cube to be one-tenth of the original cubic particle, in this case the ratio 1 to 2 might be satisfied. But are we justified in supposing that Swedenborg calculated this as the ratio of the abraded particles? I think not. A careful reading of Swedenborg's calculation in Part X, sec. 4, will show that he had no such conditions in mind, that he was describing particles from which the ramenta had not yet been removed. Assuming, therefore, Swedenborg's ratio of 1 to 2 to be correct, and the ramenta to be of the relative sizes above mentioned, the acids and cubes would become approximately equal after the removal of the ramenta.

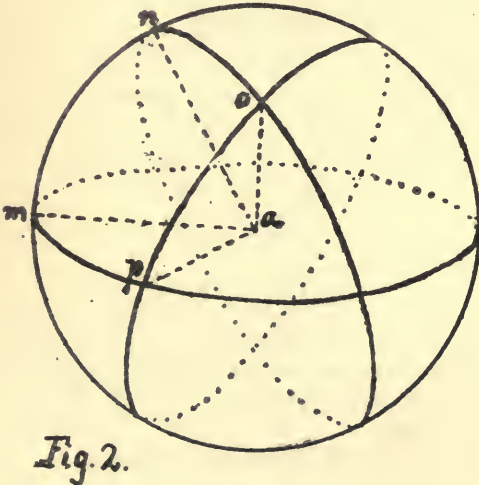
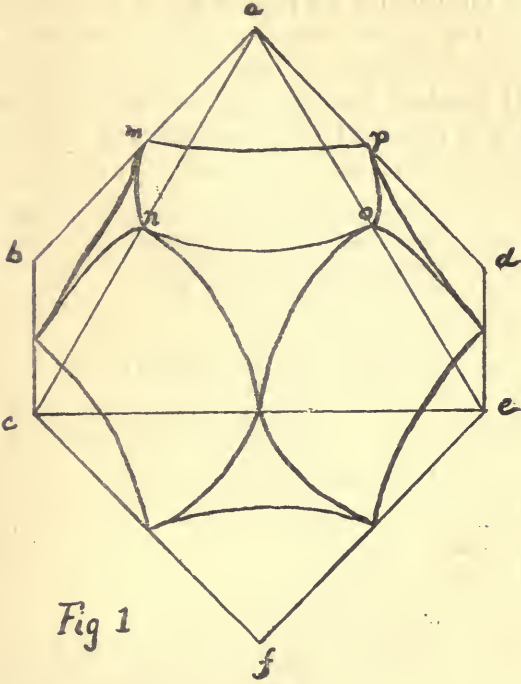
The last ratio is so wide of the mark that to avoid doing Swedenborg an injustice it is essential to understand clearly the conditions postulated in his calculations. For this reason we quote in full what he says in regard to the ratio of the triangular or acid particle to the cubic being as 1 to 2.

"The weights of the interstitial forms as compared to water.
The ratio of the spaces in the quadrilateral pyramidal position

is in accordance with the demonstration of former sections, that is to say, the full space (or that which the [water] particles occupy) is to the empty space or that of the interstices, as 3 to 1; see Part VIII of these Principles. 2. If the empty space or interstices be filled with hard matter of the fifth kind, that is, with the crustal matter of the particles of water, as shown in Plate III, Fig. H, then, I say, one cube with two triangles of that material weighs to the particle of water as 2 to 3. *Demonstration:* Let the matter in the particle of water equal 1. Under the condition that the internal cavity of the water particle according to our principles is half the space [of the particle], it follows that if it be filled with the same material [as that in the crust which constitutes the other half] the weight of the particle will equal 2. Further, since the weights are as the spaces, that is to say, as 3 to 1, thus [the ratio becomes] 2 to $\frac{2}{3}$ for the weight of the interstitial matter. If this weight be compared with the weight of the particle of water as equal to 1, the ratio becomes $\frac{2}{3}$ to 1 or 2 to 3. Whence it follows, *First*, that a cube of such matter weighs to a particle of water as 1 to 3; the reason is that two triangles occupy half the space, and one cube half." (CHEM. Part 10, sec. 4.)

We would call attention to the following points in connection with the above quotation: 1. The calculations deal with the total interstitial space between spherical particles in the fixed quadrilateral pyramidal position, as clearly indicated by the reference to Part VIII, sec. 7. 2. That the discussion relates to saline matter as originally formed at the bottom of the sea, and thus before the removal of any ramenta. 3. That the interstices are assumed to be "filled with hard matter." 4. Finally, that the statement that "two triangles occupy half the space and one cube half," or that the volume of the cube is to the volume of one tetrahedron as 2 to 1, is merely an arbitrary assumption so far as the explanations of the CHEMISTRY are concerned. The treatise gives no further light on the reason for the assumption.

On account of the importance of the ratio of the cube to the tetrahedron in its bearing on the most essential of Swe-



denborg's calculations, we present below a simple method of calculating the relative volumes of the tetrahedral and cubic spaces formed between spheres in the "fixed quadrilateral pyramidal position" postulated by Swedenborg. The method followed was suggested by an unpublished article by F. W. Swanton, on "A Revision of Swedenborg's Chemical Theory."

I. VOLUME OF QUADRANGULAR SPACE OR CUBE.

Let O = Octahedron $acdf$. (Edges each = $2d$). (Fig. 1.)

Q = Quadrangular pyramid $a-mnop$.

C = Cubical space, or "cube" $mopr$.

It follows that:

$$\text{Vol. } C = \text{Vol. } O - 6 \text{ Vol. } Q.$$

$$\text{a. Vol. } O = \frac{1}{3} (\text{base } bcde \times \text{alt. } af)$$

$$\begin{aligned} \text{Base } bcde &= (2d)^2 = 4d^2 \\ \text{Alt. } af &= \sqrt{8d^2} = 2d\sqrt{2} \end{aligned}$$

$$\therefore \text{Vol. } O = \frac{4d^2 \times 2d\sqrt{2}}{3}$$

$$= \frac{8d^3\sqrt{2}}{3}$$

$$= 3.7712 d^3.$$

$$\text{b. Vol. } Q = .4531 d^3$$

Proof: Sides of spherical Quad. $mnop$ each = 60° .
Now since a hemisphere may be divided into 4 spherical triangles and 3 spherical quadrangles, the sides all being = 60° .
(See Fig. 2.)

$\therefore$ area of spher. quad. $mnop$.

$$= \frac{0.5 - (4 \times .04387)}{3}$$

$$\therefore \text{Vol. } Q = .10817 \text{ of the sphere.}$$

$$= \frac{4 d^3 \times .10817}{3}$$

$$= 4.1888 \times .10817.$$

$$= .45310 d^3$$

c. Substituting:

$$\begin{aligned} \text{Vol. } C &= \text{Vol. } O - 6 \text{ Vol. } Q \\ &= (3.7712 - 6 \times .4531) d^3 \\ &= 1.0526 d^3 \end{aligned}$$

d. Ratio of quadrangular space or "Cube" to sphere.

$$\frac{\text{Vol. } C}{\text{Sphere}} = \frac{1.0526}{4.1888}$$

$$= .19738 \text{ of the sphere.}$$

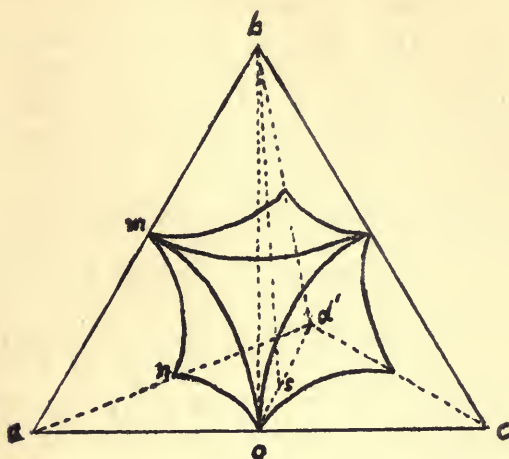


Fig. 3.

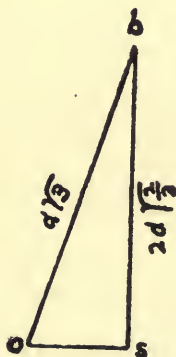


Fig. 4.

II. VOLUME OF TETRAHEDRAL SPACE, OR OF ACID PARTICLE.

Let P = pyramid $badc$. (Edges each = $2d$). (Fig. 3.)

S = Spherical pyramid $amno$.

T = Tetrahedral space mno .

Vol. T = Vol. P - 4 Vol. S .

$$\text{a. Vol. } P = \frac{1}{3} (\text{base} \times \text{alt.}) = \frac{1}{3} (adc \times bs).$$

$$\text{Base } adc = d^2 \sqrt{\frac{3}{2}}$$

$$\text{Alt. } bs = \frac{2d\sqrt{\frac{3}{2}}}{3}$$

$$\begin{aligned}\therefore \text{Vol. } P &= \frac{2}{3} \frac{d^2 \sqrt{\frac{3}{2}} \times 2d\sqrt{\frac{3}{2}}}{3\sqrt{3}} \\ &= \frac{2}{3} d^3 \sqrt{\frac{3}{2}} = .9428 d^3\end{aligned}$$

- b. Vol. S = Same fraction of sphere as mno is of spherical surface.

$$\text{Spher. area } mno = \frac{3 \text{ Spher. } \angle mon - 180^\circ}{720}$$

$$\text{Spher. } \angle mon = \angle bos.$$

$$\begin{aligned}\sin. \angle bos &= \frac{2d\sqrt{\frac{3}{2}}}{3} \div d\sqrt{3} \text{ (See Fig. 4.)} \\ &= \frac{2}{3} \sqrt{\frac{3}{2}}; (\log. = 9.974424).\end{aligned}$$

$$\therefore \text{Spher. } \angle mon = 70^\circ. 529.$$

$$\therefore \text{Spher. area } mno = \frac{[(3 \times 70^\circ.529) - 180] \text{ spher. deg.}}{720}$$

$$= \frac{31.587}{720}$$

$$= .04387 \text{ of area of sphere.}$$

$$\therefore \text{Vol. } S = \frac{4}{3} \pi d^3 \times .04387$$

$$= 4.1888 \pi \times .04387 d^3$$

$$= .18376 d^3$$

- c. Now since Vol. T = Vol. P - 4 Vol. S ,
and by calculation,

$$\text{Vol. } P = .9428 d^3$$

$$\text{Vol. } S = .1837 d^3$$

$$\begin{aligned}\therefore \text{Vol. } T &= (.9428 - 4 \times .18376) d^3 \\ &= .20776 d^3\end{aligned}$$

- d. Ratio of Tetrahedral space to one sphere,

$$\frac{\text{Vol. } T}{\text{Sphere}} = \frac{.20776}{4.1888}$$

$$= .0496 \text{ of the sphere.}$$

$$\left(\frac{1}{20} \text{ sphere} = .0500 \right).$$

III. RATIO OF TETRAHEDRON TO CUBE.

$$\frac{\text{Vol. } T}{\text{Vol. } C} = \frac{.20776}{1.0526}$$

$$= \frac{1}{5} \text{ approximately.}$$

Discrepancy in value for the relative density of saline matter.

The foregoing calculation for the relative volume of the tetrahedron and the cube affects the calculation for the relative masses of these two kinds of particles. This factor enters most frequently into Swedenborg's other calculations in the CHEMISTRY. On Swedenborg's assumption that saline matter consists of the fifth order of crustals in the quadrilateral pyramidal or most compact position, with the fourth order of crustals in their interstices; on the assumption again that these orders of particles are constituted as described, with diameters in the ratio of 1 to 10; and finally that Swedenborg's calculation for the ratio of 10:9 for the weight of a cube and two tetrahedrons to one water particle, is approximately correct,* then according to our calculation for the relative volumes of the tetrahedrons and the cube, as 1 to 5, the weight of a tetrahedron to that of a water particle would be in the ratio $\frac{7}{10}$ to 9, or 28 to 18 instead of 5 to 18 as stated by Swedenborg, (Part X, sec. 4³); and the weight of the cube to that of a water particle would be in the ratio $\frac{5 \times 10}{7}$ to 9, or 7.1 to 9 instead of 5 to 9 as stated in the CHEMISTRY (*Ib.*),—the weight of Swedenborg's tetrahedron being 44% too large and his cube almost 30% too small. The effect on the calculations for the relative weights of particles supposed to be built up in one way, and another from such tetrahedrons and cubes can readily be seen.

The specific gravity of crystallized salt.

There are three types of crystalline masses mentioned in the section on the *Crystallization of Common Salt*. 1. The one in which all the interstices are occupied by cubes and tetrahedrons, and the water of crystallization is present in the quadrilateral pyramidal position.† In this position the ratio of the number of tetrahedrons to cubes is as 2 to 1. The second type of crystallization mentioned is that in which the water particles are in the same number and arrangement as in the first and third, all the cubic spaces being filled with saline cubes while

*The ratio would appear to be from 5% to 15% too small.

†CHEM. p. 43, subdiv. 4.

the tetrahedral spaces remain empty. Such a "mass is destitute of *all* acidity, and resembles an earth in character, rather than a salt."* In this case the number of cubes is the same as the number of water particles—as in the first type of crystallization. 3. In the third case each salt particle is entire consisting of 8 tetrahedrons to 1 cube, the water particles being present in the quadrilateral pyramidal position as before. This is what is described as the most perfect crystal of common salt.†

The essential difference between the third case and the first is that there are only $\frac{1}{4}$ the number of cubes present in the first. The number of water particles to cubes is therefore in the ratio of 4 to 1 instead of 3 to 1 as stated by Swedenborg.‡

In regard to the third type of crystal here mentioned, or that of "common salt," the reader of Swedenborg's CHEMISTRY could hardly help being struck by the fact that Swedenborg's calculated specific gravity is $23 \frac{1}{9}$ to 11 or 2.1, which is equal to the specific gravity of pure sodium chloride, or pure "common salt" as recognized to-day. Swedenborg, speaking of the values of his day said, "The weight of a mass of the best salt is to the weight of its volume of water as $1\frac{3}{4}$ to 1, (or 1.75), which nearly coincides with our calculation." (CHEM. p. 44.) Thus it appears that Swedenborg's calculations were more accurate than the observations of his day. The coincidence at first glance looks like a triumph, and the same is true in the case of several other results at which Swedenborg arrives. But the calculations fall to the ground when analyzed, and they indicate that Swedenborg was working to devise a theory which would fit known values, and that he was deceived by the approximate agreement and deterred from examining the details of the calculations more closely.

In examining the calculation, we find two very important discrepancies. The one involves a value 25% too small, and the

*CHEM. p. 43, *subdiv.* 3.

†*Ib.* p. 37, sec. 3.

‡CHEM. p. 39, sub. 12. See also pp. 41-42, sec. 4. The error was probably due to the misleading character of Fig. G, Plate IV.

The spaces where the cubes are absent are the only "vacancies" which could answer to those mentioned in CHEM. p. 38, and misleadingly represented in Plate IV, Fig. G.

other a value 25% too large, so that they tend to balance each other in the result. The first is involved in Swedenborg's assumption that the number of water to salt particles is 3 to 1. This assumption, as has already been stated, was due to the misleading nature of Fig. G, Plate IV. It may readily be seen that if in the first type of crystallization, where all the interstices are filled with saline matter, the proportion of saline matter is one cube and two tetrahedrons to each water particle;* then in the case where the salt particles are entire, *i. e.*, where each cube has eight tetrahedrons, three cubes will have to be removed to leave the six tetrahedrons required, and the remaining salt particles will be to the water particles, which are stated to be in the same number and relation as before, in the ratio of 1 to 4.

The second discrepancy concerns the weight of an entire salt particle as compared to water, which Swedenborg calculates as 25 to 9,[†] and which ought to be 18.2 to 9, on the assumption that the weight of *one* cube and two tetrahedrons of saline matter are to one water particle as 10 to 9.[‡] As already shown, one tetrahedron must in this case weigh to a water particle as 28 to 18, (see p. 231); therefore, six tetrahedrons would weigh 1.4×6 , or 8.4 to 9, and the entire salt particle 18.2 to 9, instead of 25 to 9 as calculated by Swedenborg on the assumption that the volume of tetrahedral interstice is one-half that of a cubic interstice, which we have shown to be incorrect. (See page 225.) It is to be noted that when the calculation for the density of common salt is repeated according to Swedenborg's method in the first paragraph of sec. 4, Pt. XI, and with the two corrections we have spoken of, the result is approximately 1.78 which is remarkably close to 1.75 which Swedenborg gives as the recognized density of the best common salt in his day. But this coincidence is of no real significance. The calculation is made on the assumption of the presence of a large proportion of water of crystallization

*CHEM. p. 43, subdiv. 4.

†*Ib.* Pt. XI, sec. 4.

‡*Ib.* Pt. X, sec. 4³.

in salt, in fact the theory as already shown, supposes 4 water particles to one salt particle, or 35% of water by weight, whereas we shall have occasion to show later that there is absolutely no evidence of the existence of any water of crystallization in pure common salt.

The so-called "small vacancies" in the crystals of common salt. From the analysis already made of Swedenborg's description of the constitution and structure of the crystal of common salt, it will appear that the "vacancies" spoken of in Pt. XI, sec. 3^o, must be complete cubic interstices of the same shape and size as that of the central mass of each salt particle. The diagram as already pointed out is very misleading on account of the misrepresentation of the relative size of the salt particles. The misleading nature of the diagram is very evident from Swedenborg's conclusion that the ratio of the number of water to salt particles is 3 to 1 instead of 4 to 1. There seems no doubt that he drew some of his conclusions from his diagrams.

Mathematical discrepancies in the theory of niter.

We have already called attention to the fact that the fixed triangular pyramidal position in which Swedenborg assumes the water particles to be in the crystals of niter is essentially the same as the fixed quadrilateral pyramidal position ascribed to the water particles supposed by Swedenborg to exist in the crystals of common salt.* This the reader can best analyze for himself by the use of models. Such an analysis would also reveal the following facts:

1. That if spheres be fixed as directed by Swedenborg the "fixed quadrilateral pyramidal position" would result, and no other.
2. That 14 spaces would surround any given sphere, providing room for 14 "acids" as postulated in the case of Swedenborg's description of the niter particle.
3. That these 14 spaces would be of two kinds, 6 of them being tetrahedral like the "acids," and 8 cubical like the central "cubes" of Swedenborg's salt particle.

*p. 222.

4. That there would be room for approximately 22 acids on the surface of the niter particles instead of only 14.

5. That to satisfy all the conditions mentioned by Swedenborg the crystals of niter ought to contain 7 water particles for every particle of niter instead of 3 as stated by him.*

6. That it is possible to arrange twelve spheres around one of the same size in such a way that all the spaces or interstices surrounding the central particle will be tetrahedral or "triangular." But that in this case,

a. The surrounding spheres would not touch each other as postulated.

b. The number of tetrahedral spaces surrounding the central sphere would be 20 instead of 14, and would lead to the supposition that there ought to be 20 "acids" on the surface of the niter particle.

c. A pentagonal arrangement of the particles and pentagonal crystals of niter would result instead of hexagonal ones as postulated.

Discrepancies in the case of the specific gravity of niter.

Swedenborg's calculation for the specific gravity of crystallized niter in comparison with water is 11 to 6 nearly‡ or 1.8333, which agrees approximately with the experimental value of his day, given as nearly 5 to 3† or 1.666. As in the case of common salt, Swedenborg's calculated value comes nearer to the more accurate measurements of to-day than did the experimental value of his day, the specific gravity of pure salt-peter or potassium nitrate being 2.1. But here again the validity of his calculations are just as questionable.

Weight of Swedenborg's niter particle. Taking the weight of the tetrahedron to that of a water particle as 2.8 to 18, the weight of a niter particle compared to a water particle would be 39.2 to 18, or more nearly 2 to 1 than 4 to 1 as Swedenborg says. (Pt. XVI, sec. 1.)

Discrepancies in regard to the calculation of the weight of the crystals of niter. In the first place it will be found that

*CHEM. Pt. XIII, p. 98.

‡Ib. p. 100, sec. 6.

†Ib. p. 101.

seven particles of water to one of niter are needed to produce the crystalline structure which Swedenborg describes, (Pt. XIII, sec. 5), instead of 3 to 1 as Swedenborg states. (Pt. XIII, sec. 5 and sec. 6.) This means that the calculation for the ratio of the density of niter to water ought to be 1.14 or approximately 7 to 6 instead of 11 to 6, the result that Swedenborg arrives at. (Pt. XIII, sec. 6.)

The specific gravity of niter according to this calculation ought to be 1.14 instead of 2.1 as indicated by present experimental values. The validity of our calculation will appear very evident after a moment's thought. Note the fact that each niter particle displaces one water particle out of eight. Since each niter weighs approximately twice as much as a water particle, the weight of the crystalline mass would be to water in the assumed position, approximately as 9:8, or allowing for the assumed differences in the density of fluid water the specific gravity of niter would be 1.14.

Were we to substitute the water particles of the later *PRINCIPIA* for those of the *CHEMISTRY* the results would again be very different. The water particle as described in the *PRINCIPIA* would be at least twice as heavy as that of the *CHEMISTRY*.

According to the theory, crystals of niter ought to consist of from approximately 50% to 75% of water. If this theory were correct it would seem plausible that it ought to be possible to detect the presence of so large an amount of water by chemical analysis. Crystals of many substances do contain relatively large amounts of "water of crystallization," those of other substances lesser amounts, and analysis is able to detect the amount of this "water of crystallization" with great accuracy. But all analysis of crystals of niter seem to prove conclusively that they contain no such water of crystallization, contrary to Swedenborg's hypothesis.

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NOTES BY THE EDITOR.

In the Preface to the English edition of the FIBRE when speaking of Part III., On the Diseases of the Fibre, the translator refers to another of the author's MSS., which, under the caption, Diseases of the Brain, deals with the same subject under very much the same chapter-headings. At the commencement of this latter treatment the author has the marginal note: "In place of a preface consult what I have written in 4to on diseases of fibres in general. The translator points out that except for the note, it is quite clear that Diseases of the Brain was written prior to Diseases of the Fibre; but that the note introduces some obscurity into the question.

On this point we have received a suggestion from a member of the Association, the REV. WILLIAM H. ACTON, which is worthy of consideration. Mr. Acton writes: "In regard to the reference (in the Preface) to Diseases of the Brain, I would suggest that the marginal note referring to the 4to treatise on Diseases of the Fibre *may* have been entered *after* both works had been written. In other words, Swedenborg may have written first the draft on diseases of the brain, and afterwards that which is contained in the Fibre; then, some time later, having occasion to turn to the MS. on the Brain he came across the treatise on diseases there drafted, and *pro mem.* noted that this had already been treated of more fully in Diseases of the Fibre,—perhaps with the intention of consulting that treatise if the subject of diseases of the brain needed to be further discussed?"

SWEDENBORG'S FIRST WORK ON THE BRAIN.

In the present issue we commence the translation of a work by Swedenborg which has hitherto seen the light only in the edition of Photolithographed MSS. The work constitutes

what the author calls his "first project" on the human brain. It is clear from much evidence that this "first project" was intended as the first of the physiological series, volumes I and II of which were subsequently published by the author under the title *Economy of the Animal Kingdom*. In other words, Swedenborg's first intention had been to commence his physiological series from the brain. But later he altered this plan so as to commence from the blood, and follow with the part on the brain as the second volume of the series. The second volume, as published, treats of the cerebral cortex and the animation of the brain, after which it proceeds at once to the spirituous fluid and the soul. In this respect it differs from the "first project," the translation of which we now commence, in that the latter, while commencing with the cerebral cortex, continues with a chapter on the medullary substance and then proceeds to a discussion of the various parts of the brain. This discussion is, however, interpolated by long chapters on the Animation of the Brain, and on the Animal Spirit; and a cursory study of these chapters leaves us in no doubt but that the whole work is a first draft of what was subsequently published as volume II. of the *ECONOMY*,—or, rather, was a first treatment of subjects included in that volume.

But the change in plan indicates more than the commencement from the blood instead of from the brain. The original plan was to commence from the brain, and immediately to proceed to a discussion of the parts of that organ. As amended, the plan was to deal first with the blood,—the universal of the body,—and then to take up the brain only in a universal consideration; and afterwards the medullary and nervous substance, the discussion of the parts of the brain to be reserved for a future volume.

Therefore the treatise which we now commence may be regarded as in some respects, namely, the parts on the cerebral cortex, the animation of the brain, and the animal spirit, a first projection of volume II. of the *ECONOMY*; in other respects,—the part on the medullary substance,—as a first projection of volume III. (*The Fibre*); and the rest of the work as a first treatment of the organs of the brain, which was subsequently planned as Part IV. of the *ECONOMY*.

The manuscript, from a photolithographed copy of which our translation is made, originally consisted of 1,482 pages; but, as now preserved, it contains only 1,098 pages. Nearly all the missing pages are from the early part of the work. Several of the pages have been torn lengthwise, and only the one-half of them preserved. These mutilated half pages were, unfortunately, not included in the photolithographed reproduction; but we hope, by the courtesy of the ROYAL SWEDISH ACADEMY OF SCIENCES, to secure a copy of them, from which we can at least obtain some idea of their contents.

The translation now commenced will be continued through many issues of the NEW PHILOSOPHY before being completed. Our readers will, we are certain, welcome the work both as a unique and valuable addition to Swedenborg's available writings, and as a notable carrying out of the purpose of the SWEDENBORG SCIENTIFIC ASSOCIATION to translate and publish the writings of the Swedish philosopher.

THE TITLE "ANIMAL KINGDOM."

We note the suggestion made by an esteemed contributor that some title more appropriate than "Animal Kingdom" should be found as a translation of Swedenborg's "Regnum Animale." This question has been frequently discussed by students of Swedenborg's physiological works, and many years ago it was brought up at one of the annual meetings of the SWEDENBORG SCIENTIFIC ASSOCIATION. A suggestion made at that meeting, and which has been frequently made at other times, was to adopt the translation "The Soul-Kingdom," or "The Kingdom of the Soul." Another suggestion that might be considered is "The Animate (or Animated) Kingdom.

But neither of these suggestions offer any inducement to depart from the classic, time-honored, and, moreover, literally exact translation "Animal Kingdom." To a stranger this title might be misleading, provided his knowledge is confined to the mere back of the book, or to the title as printed in a catalogue; but this would by no means be the first time that titles are not wholly illuminating, and need to be supplemented by some examination of the book itself. This, however, is a

small matter, for readers usually wish to know a little more concerning a book than its mere title; and in this particular case there are few, indeed, of all those who are at all likely to read the book, who do not know its nature or who cannot ascertain this without any difficulty. More important is the question of the suitability of the title considered in itself.

Whether misleading or not, the title "Regnum Animale," given by the author himself, embraces exactly the same range of meaning as the English words "Animal Kingdom." The Latin word *animale* means "an animal," "a breathing animated creature." It is frequently used by Swedenborg and his contemporaries to mean "man as an animal,"—mere animals being called *bruta* or *bruta animalia*. We have also much the same usage in English, though now the term *animal* is more common than *brute animal*. But Swedenborg,—and also his contemporaries,—very frequently uses the word *animalia* as also meaning "brute animals," as well as men,—exactly as in English. Moreover we have his own specific definition of the term "Regnum Animale" as including "men, other animals, and insects" (*Fibre*, 281); and the words are used in the same way in his theological writings (see *Heaven and Hell*, 108; and *Div. Love and Wis.*, 65).

It is therefore, clear that according to Swedenborg's own usage, the term "Regnum Animale" embraces exactly the same range of meaning as its English equivalent "Animal Kingdom;" and any objection that may be made against the one is equally valid against the other.

When entitling his physiological works, "Animal Kingdom," Swedenborg certainly did not mean that the series was to deal with the kingdom of the brutes; but certainly also he did not mean, except in the most general way, that it was to deal exclusively with the kingdom of the human soul. As it seems to us, by this title he meant the kingdom of the animal man, or the ultimate or animal kingdom of man; and the treatment of this involves both much consideration of the anatomy of the brutes,—and the author makes frequent use of this anatomy,—and the investigation and discovery of principles that are equally applicable to man as an animal, as to the brute. The physiological series is a series that concerns the animal king-

dom, the kingdom of the animal, and particularly of man as an animal. This is clearly implied in the following passage from the *ADVERSARIA*: "From a comparison of the man in whom is the kingdom called the animal kingdom, with that man by whom is signified the society in which is the Divine Image," etc. (1 *Ad.* 523). The comparison here meant is between man as an animal, and man as a spiritual being; or the natural man and the spiritual. The one is in the animal kingdom, the other in the divine kingdom.

It would seem, therefore, not only that Swedenborg's title "*Regnum Animale*" is exactly equivalent to the English "Animal Kingdom;" that it has the same range of meaning, and is liable to the same objections; but also that the words "Animal Kingdom" are the only words that can be used to express exactly what the author intended to convey by his Latin title "*Regnum Animale*."

BOOKS RECEIVED.

THE EVANGEL OF A TRULY RATIONAL FAITH, by L. Castro de la Fayette. Translated from the Portugese with minor adaptations by E. E. Iungerich. Academy Book Room, Bryn Athyn, Pa. pp. 75. Cloth, 75c.; paper, 25c.

The writer talks to his reader as to a friend, and, fortified alike by the Scriptures and by the dictates of common sense, he talks with simplicity and clearness. Like the apostles of old he at once proclaims the very nature of his message, the Coming of the Lord. "Friends: (thus read his opening words) The time has come to disclose to you that on the nineteenth day of June in the year 1770 the Lord Jesus Christ called together the twelve apostles who had followed Him on earth and sent them out to all parts of the spiritual world to preach the gospel that the Lord Jesus Christ reigns." He then proceeds to an exposition of the gospel itself, dwelling with abundant illustration on the consummation of the former Christian Church and the rise of a New Church as foretold in the New Testament.

The style is clear, the diction most pleasing and the argument so forceful as easily to hold the reader's attention. We know of no better work proclaiming the gospel of the Second Coming.

REPORT BY MR. STROH.*

Ever since the year 1902, when the scientific and documentary work on Swedenborg's MSS. in Sweden was begun by the writer of the present review, annual reports of the results have been published in *THE NEW PHILOSOPHY* or elsewhere. On the editor's arrival at Stockholm in 1902 the phototyping of Vol. I. of the *SPIRITUAL DIARY* had been completed, and the volume bound. The remainder was seen through the press in Vols. II. and III., and then followed three volumes of Swedenborg's *BIBLE INDEX* for the Swedenborg Society, London. In 1910, after the International Swedenborg Congress, British and American representatives authorized twelve additional volumes, subsequently arranged together with the previous six as Vols. I. to XVIII. of a series, entitled *EMANUELIS SWEDENBORGII AUTOGRAPHIA, EDITIO PHOTOTYPICA*. The twelve additional volumes include the *ADVERSARIA*, 3 vols., *ARCANA CŒLESTIA*, 5 vols., *APOCALYPSE EXPLAINED*, 3 vols., and *MISCELLANEOUS THEOLOGICAL WORKS*, 1 vol. The progress of this great series has been reported monthly from 1911 to 1916, in the editor's annual reports. These reports, and others relating to the work in London, together with special reports by Professor ALERED ACTON *re* phototyping, will appear in Part II. of *THE SWEDENBORG ARCHIVES*, Part I. of which appeared in 1912 at Stockholm. The same Part II. will also contain other important documents illustrating the history and plans of the work in Sweden, such as the Minutes of the Swedenborg Committee of the Royal Swedish Academy of Sciences, the Resolutions of the London Swedenborg Society's Committee and Council, etc. The editor's intention is to forward regular quarterly reports to the Editor of *THE NEW PHILOSOPHY*, beginning with the first quarter of 1918.

The *MISCELLANEA THEOLOGICA*, Vol. XVIII. of the Phototyped Manuscript, having been curtailed in its intended and authorized scope by the officials of the London Society in

*Address to the Swedenborg Scientific Association at its annual meeting, May, 1918. See p. 199.

order to save expense, the American societies have authorized the continuation independently. Having returned to Sweden in August, 1917, the editor saw through the press pp. 451-618 of MISCELLANEA THEOLOGICA from September to January, proofs being sent to the libraries of the Academy and Convention as usual. Unfortunately the high price of paper made its purchase impossible, and recently the State has confiscated all rags for such all-rag paper, so that the printing stopped.

As one of the original members of the SWEDENBORG SCIENTIFIC ASSOCIATION, and as the representative abroad since 1904, I have endeavored to arouse interest in the taking up by the Association of a propaganda to phototype Swedenborg's scientific and philosophical MSS., for this great use falls definitely under the first purpose of the Association, namely:

"The preservation, translation, publication and distribution of the Scientific and Philosophical works of Emanuel Swedenborg."

I submit that nothing would so greatly ultimate this purpose as the preservation by phototyping of the remaining unreproduced MSS. of Swedenborg. Now that the theological MSS. are phototyped, the remainder should be added. Although the necessary paper is difficult to obtain at present, the printer is anxious to obtain in advance a large stock of negatives and films for two additional volumes, so that the establishment of trained employees can be kept busy and the printing pushed later on. In the Reports of Professor ALFRED ACTON, and in the Memorial of the SWEDENBORG SCIENTIFIC ASSOCIATION to the Academy and Convention last year, the new phototyping was proposed, and as an alternative the scientific and documentary work. Since December, when the phototyping began to come to a temporary conclusion due to a lack of paper, the editor has followed the course indicated by the alternative, and it is this scientific and documentary work which is now being advanced, and concerning which a detailed special report is submitted below.

Recently the Secretary of the Royal Swedish Academy of Sciences, Professor C. Aurivillius, was visited in order to turn over to him the Minutes of the Swedenborg Committee from

1902 to 1915, and the MSS. for Vol. IV of the Academy's Swedenborg series OPERA DE REBUS NATURALIBUS. I had with me also the bound copy of the CHRONOLOGICAL LIST of Works and Documents by and concerning Swedenborg laid on the table of the SWEDENBORG SOCIETY in London, 1913, at the Annual Meeting. This List will be issued as promised in the series, forming the proposed Appendix to Vol. I. The three Parts contain references to works by Swedenborg (Pt. I.), to Documents by Swedenborg (Pt. II.), and to Works and Documents concerning Swedenborg (Pt. III.), which closes with the year 1745, as the scope of the Appendix has been confined to Swedenborg's original productions and to the references concerning them so far as the scientific or earlier period of Swedenborg's authorship is concerned.

As regards Vol. IV, DÆDALUS HYPERBOREUS ET OPUSCULA MISCELLANEA, it will include the 154 pages of the DÆDALUS, photolithographed in 1910, and miscellaneous small works, including both unpublished MSS. and printed rareties. While the DÆDALUS was passing through the press in 1910, the Royal Society of Sciences of Upsala had an edition struck off as its festival publication, with an Introduction by the Perpetual Secretary, the Professor of Astronomy, NILS DUNER. This Swedish Introduction, concerning the DÆDALUS and the Society's early history, will appear in Vol. IV of Swedenborg's OPERA in English as the Introduction, and the volume will also as usual in the series include editorial notes at the close.

When in America I promised to forward to the SWEDENBORG SCIENTIFIC ASSOCIATION a list of the American subscribers to Vols. II to III, so that the arrangements may be made for subscriptions to Vol. IV, etc. A prospectus concerning the future volumes was forwarded to THE NEW PHILOSOPHY in January after the editor's Annual Report. A printed prospectus will be distributed from Stockholm when Vol. IV appears. The fund of the Academy of Sciences for the Swedenborg publications amounts to some 4,000 kronor, and as the American and other foreign subscriptions will probably dispose of several hundred copies of Vol. IV, and of

the Appendix to Vol. I., it is proposed to devote the income to the publication (as Vols. V. to VII.) of the OPERA PHILOSOPHICA ET MINERALIA in a photolithotyped facsimile reduced in size of page one-third. The 125 subscriptions of the London Swedenborg Society for the whole series contains the proviso that the OPERA PHILOSOPHICA ET MINERALIA be included.

The proposed new edition of "Documents concerning Swedenborg" will be included in a series, entitled "The Swedenborg Archives," together with bibliographical collections and reports. Vol. I. of this series will contain Parts I. and II. of the ARCHIVES referred to in the beginning of the present review. Parts III. and IV. will be the DÆDALUS and EMANUEL SWEDENBORG AS A SCIENTIST, 500 copies of these separate from the Stockholm OPERA, having been presented to the editor for the purpose by the ROYAL SWEDISH ACADEMY OF SCIENCES on the recommendation of its Swedenborg Committee in a final Report. Part I. was paid for by the editor, and Part II. will be off the press soon, after which the four parts and the reprint of the Appendix to Vol. I. of the OPERA, or the CHRONOLOGICAL LIST, can be bound up as Vol. I. of the ARCHIVES. In order to meet all expenses for this volume, and for the future volumes of the series, I have appealed to persons in England and America to make donations for the issuing of Vol. I. and for the editing of further matter, and to the societies and periodicals for the publication of an edition of 500 separate sheets for binding, as Vols. II to VI pass through the press *seriatim* in the New Church periodicals.

Vol. II., "Hyde's MSS. relating to Swedenborg," has been partly forwarded to the QUARTERLY. Vol. III., the "CHRONOLOGICAL LIST," re-edited in a single series of numbered chronological references, will be forwarded from time to time to the NEW CHURCH MAGAZINE, with miscellaneous scientific and biographical papers already contributed. Vol. IV., "Documents by Swedenborg," for NEW CHURCH LIFE, has been forwarded so far as the early part is concerned, the 92 letters at the close of Vol. I. of the Stockholm OPERA. Vol. V., "Documents concerning Swedenborg," some 170 documents,

has been sent to the NEW CHURCH REVIEW. Altogether over 1,000 pages of MS copy for press have been prepared recently and forwarded, and more will follow.

To sum up: while the phototyping has come to a standstill, the above account shows that the scientific and documentary work is being pushed vigorously. The three main lines of work are as before, since the year 1902, the phototyping, the scientific and the documentary series, undertakings involving much labor and money. In the development of these uses the SWEDENBORG SCIENTIFIC ASSOCIATION has supplied the inspiration and moral power, and it is to be hoped that as in the past the other societies interested in the preservation and publication of Swedenborg's MSS. in Sweden will give their support, financial and organic.

ALFRED H. STROH.

Upsala, Sweden, March 5th, 1918.

THE FIBRE.

A REVIEW BY EDWARD CRANCH, PH. B., M. D.

ECONOMY OF THE ANIMAL KINGDOM. By EMANUEL SWEDENBORG. VOLUME III. THE FIBRE. Translated and edited by Alfred Acton, M. A., Th. B. SWEDENBORG SCIENTIFIC ASSOCIATION, PHILADELPHIA, 1918. pp. lxxii + 382.

This volume is an ably translated and excellently printed copy of Swedenborg's work on THE FIBRE, or the nerve tissues of the human body, never before published in English. The two preceding volumes of this series of Transactions, entitled by their author *ŒCONOMIA REGNI ANIMALIS*, were translated by the Rev. Augustus Clissold, M. A., about 1848; and at about the same time, this third Transaction, *DE FIBRA*, was edited and published in Latin by Dr. J. J. Garth Wilkinson. The latter also translated and published, in 1843, one of three volumes of a later work by Swedenborg, the *REGNUM ANIMALE*, edited and published in Latin in the same decade, by Dr. J. F. IMMANUEL TAFEL, at TUBINGEN.

All these volumes from the mind and pen of the great Swedenborg, together with his volumes on the BRAIN, and on

RATIONAL PSYCHOLOGY, are evidences of a stupendous and minute study of the anatomy and physiology of the human body, considered as the abode of the animus or lower soul, and of the psychic or rational mind. Through these studies Swedenborg hoped to unravel the mysteries of the inmost, the immortal soul itself, the pneuma, or mens.

In these volumes, and especially in the one now before us, on the Nerve Fibre, its origins, distributions and functions, Swedenborg elucidates his famous doctrines of Form, Order (or Series) Degrees, Correspondence, and Influx. Form is shown to mean the development of organic structure according to the rules of a higher geometry, employing lines, planes, spheres, circles, spirals and vortices; and Swedenborg's conclusion is that all the discrete degrees of life are in orderly series of active organic forms, corresponding to each other in higher and lower degrees, the lower degrees all receiving orderly influx from the superior or interior degrees. All this is elaborated and shown by a wealth of detail and illustration,—for plates, also, are appended to the volume. Much of this detail, to a superficial regard, might seem almost superfluous, but it will richly repay the careful reader, whether investigating physiology or psychology, or seeking confirmation of the wonderful lessons on the correspondences of the human body, heaven, and the Lord, as given in those later works, which are the interior revelation for the New Church made by the Lord through this most wonderfully prepared human agent, Emanuel Swedenborg.

In these revelations only did Swedenborg find the true answers to his patient search for the nature of the *Anima*, the soul itself, the truly immortal man.

Some learned scientists, in Sweden and elsewhere, are waking up to the recognition that what our author so laboriously studied is now being wonderfully corroborated by modern investigations, as in the case of the motions of the brain, the structures of the nerves, etc.; and they see that Swedenborg was, and, for that matter, still is, ahead of these our times.

On the other hand, it is sad to record the fact that at least one professor of biology in this country, a specialist on the

brain, and an avowed Newchurchman to boot, avers that he has no use for the scientific writings of Swedenborg, although he admits having read them!

The following passage from the Theological Writings, with many others that might be cited, will serve to show how the students of the New Church can look with increasing interest on the scientific works, through whose means Swedenborg was Divinely prepared for his future mission as the messenger of the Second Coming of the Lord:

"A like progression from firsts to outmosts, and from outmosts to firsts, is exhibited in the forms, most purely organic, of affections and thoughts in man. In his brains are those star-like forms called cineritious substances (or cortical glands or cells); out of these go forth fibres through the medullary substance by the neck into the body, which press their course to the outmosts of the body, and from these outmosts return to their firsts. This return of the fibres to their firsts is made through the vessels of the blood. There is a like progression of all affections and thoughts, which are changes and variations of the state of those forms and substances; for the fibres issuing out of those forms or substances are comparatively like the atmospheres from the spiritual sun, which are containants of heat and light, and the acts produced by the body are like the things produced from the earths by means of the atmospheres, the delights of whose uses return to the source from which they sprang. . . . The uses of all created things ascend by degrees of height to man, and through man to God the Creator from whom they are. . . . The end of creation takes form in outmosts, which end is that all things may return to the Creator and that there may be conjunction." (*Div. Love and Wisdom*, 316.)

See also a Memorable Relation in TRUE CHRISTIAN RELIGION, n. 160, where after telling that some had been rejected from heaven when it was shown that the hinder parts of their heads were hollow, the passage concludes:

"On the way home we talked about the reason why in the spiritual world the back parts of the head of those who take delight in doing evil are hollow. And I gave as the reason that man has two brains; one behind, called the cerebellum, and one in front, called the cerebrum; and the love of the will dwells in the cerebellum, and the thought of the understanding in the cerebrum, and whenever the thought of the understanding does not guide the love of man's will, the inmosts of the cerebellum, which in themselves are heavenly, collapse, hence the hollowness."

Compare with this the FIBRE, in n. 462, "The cerebellum is deprived of all power of acting, as often as the cerebrum acts from itself." The inference is, that when both act harmoniously, the cerebellum keeps well, and is in no danger of collapsing; but when, in disease, as in epilepsy, the tumult in the cerebrum is excessive, the cerebellum cannot act. But when the understanding, or the cerebrum, is orderly, and from revealed truth teaches the love or will what to do, then, if the will compels itself to obey, the organ of the will, the cerebellum, receives its proper nourishment, and grows without danger of collapse.

Returning to outward scientifics, it is shown in the work before us that every fibre carries a real fluid content, that circulates within the fibre. This fluid is formed in the cortical gland, which is formed directly at the termination of a little twig of one of the arteries of the brain, and this gland or cell acts upon its fluid as the heart acts upon the blood, impelling it through the fibre, till it is discharged again into the blood stream in the body, and so is returned to the brain and cortex to be nourished and renewed.

The brains themselves, as well as all the nerves and the fibres of nerves, are sheathed in membranes derived from the arachnoid membrane, which is fully treated of in one of the sections of this book. In and through these sheaths, bathing and cleansing the fibre, runs a stream of delicate lymph, known as the cerebro-spinal fluid. This is the only fluid now recognized as belonging to the nerves. Modern science ignores any thought of a nerve fluid circulating within the cortical glands and their fibres. It speaks only of "impulses" and denies any knowledge of the nature of those "impulses." In general, instead of treating of the spinal cord as an appendage to the brain, in which relation Swedenborg consistently places it, modern science prefers to regard the brain as an evolved appendage to the spinal cord! As Raymond's *Physiology*, 1901, puts it, "the brain or encephalon, is that part of the cerebro-spinal axis situated within the cranium or skull."

In n. 404 of the FIBRE, Swedenborg fully describes the dependence of the medulla oblongata and the medulla spinalis

upon the superior and originating organs, the cerebellum and cerebrum. This lead of the brain over the spine and body, is more fully dwelt upon in the *DIVINE LOVE AND WISDOM*, and elsewhere in the Writings of the Church.

Speaking of the circulation of a fluid in the nerves, it is pleasant to be able to record that the late celebrated surgeon of Philadelphia, Dr. Samuel D. Gross, asserted that one of the principal causes of "surgical shock"—of fainting and collapse after wounds and operations, comes from the direct loss of nervous fluid, poured out from severed nerves! But he and his ideas are "out of date" now. Other forms of shock, from concussion, fright, blows on the head, and the like, find speedy illustration in the sections on coma and other disturbances of the brain, treated of in the *FIBRE*, in its third Part, which deals with the diseases of the fibre.

The translation from the Latin in this work is extremely accurate and successful. Seeming difficulties are overcome by careful attention, showing that any difficulty of comprehension is not due to faulty translation, but only illustrates the need of paying close attention to the ideas. Thus in n. 154, it seems at first glance to teach that a fibre is both elongated and shortened when full. Comparison with the original shows the translation to be faultless; but we must take into account the different action of arteries within and outside of the brain, also the different states of the fibre when traversed (*percursa*) by its fluid, and when simply full (*impletur*).

The arrangement of the index is new and, as planned, it acts as a "digest" making it very easy to find any given subject,—which is the chief end of an index, anyway. It must have cost Professor Acton an extended season of toil to get it up, and he deserves the thanks of all who by use become acquainted with its excellent plan.

Enough has been said, let us hope, to encourage students of Anatomy, Physiology and Psychology, as well as careful readers of the inspired Writings of the New Church, to pay especial attention to this new translation of so important a work as this upon the *FIBRE*, or nerve-origins, nerve-structures, and nerve-functions in the human body.

THE RATIO BETWEEN THE ALKALINE CUBE AND THE ACID TETRAHEDRON.

BY E. E. IUNGERICH.

In FIGS. 1 and 3 (p. 227, 229 of the July issue), PROF. BROWN has accurately portrayed the shapes of the two kinds of interstices occurring among spherules piled in the fixed quadrilateral pyramidal position. His calculation convincingly proves that the ratio of their volumes is almost exactly 5:1. For the following two reasons, however, I am compelled to dissent from his tacit assumption that the shapes of these two voids are identical, respectively, with the shapes of the alkaline cube and the acid tetrahedron, whose ratio is declared by Swendenborg to be not 5:1 but 2:1.

FIRST. Eight tetrahedra were genetically affixed to the eight corners of an alkaline cube, to make the salt particle. To be so affixed there had to be a ball and socket relation between their contact surfaces. As the union was fairly stable, the matter composing the ball or spicule that fitted into the corresponding socket could not be trifling or negligible.

SECOND. The predicates given to the acid tetrahedron require that the balls or spicules be on it. By compensation, the sockets or cavities must be in the alkaline cube. "*A particle of acid,*" we read, "*has four hollow sides and four extremities or pointed portions,*" (*Chemistry, English edition*, p. 67). Its penetrative power is graphically represented, (*Ibid.* Plate VII., Fig. 14), as due to the pressure of a water particle on one of its hollow sides causing the opposite extremity or pointed portion to bite into the object attacked.

Now Prof. Brown's diagram of the smaller or tetrahedral interstice, (FIG. 3, p. 229, of July *New Philosophy*), fails to depict an acid particle of the required properties. It has, to be sure, the four hollow sides; but in place of the "opposite pointed portions" there are only blunt buffers, that is, flat plane triangles with concave arcs as sides. Such a particle could not conceivably have any biting or erosive effect. It needs

four bayonnette-like spicules erected on each of its four plane surfaces to give it the requisite bite.

We come now to the calculation of the volume of such a spicule, x . Eight such volumes are to be deducted from the volume, v , of the cubic interstice, so as to give us the true alkaline cube; and four are to be added to the volume, $\frac{v}{8}$, of the tetrahedral interstice, so as to give us the true acid tetrahedron. These resulting volumes must then satisfy Swedenborg's 2:1 ratio.

$$\text{Therefore} \quad v - 8x = \frac{2(v + 4x)}{5},$$

$$\text{or} \quad -16x = -\frac{3v}{5}$$

$$\text{Whence} \quad x = \frac{3v}{80}.$$

This means that if the cubic interstice measure 80 units; the tetrahedral interstice would measure 16 units; and the spicule or cavity, 3 units. Eight cavities subtracted from the cubic interstice would leave 56 units as the measure of the alkaline cube; whereas four spicules added to the tetrahedral interstice would produce 28, the half of 56, as the measure of the acid tetrahedron. A spicule of 3 units seems most appropriate in comparison with these other dimensions.

It may, of course, frequently happen that the delicate spicules are broken off a given acid particle and even that a cavity of equivalent depth is made in it. When this occurs a number of acid particles may join together, ball and socket-wise, to give a complex acid radical of altered valency.

But the normal or model acid particle, the one to which the absolute alkaline cube or caput mortuum has a 2:1 ratio, is evidently that one so precisely defined as having "*four hollow sides and four extremities, or pointed portions.*" The alkaline cube being twice as large, possesses eight cavities, each capable of exactly imbedding the pointed portion of some acid tetrahedron.

THE BRAIN.

BY EMANUEL SWEDENBORG.

(*Being a first draft of volume II. of the Economy of the Animal Kingdom.*)

24*. The import and action of the cortex of the cerebrum, cerebellum, and both medulla can in some sort be inferred from the anatomical experience set forth above; but for the further investigation of its use there is required an abundance of those phenomena and effects which result from the particular and general operation of its parts. And yet, not even with these do we arrive without doubt at causes, unless reason and the philosophy of the mind know how to form the connection, and by this connection to draw conclusions from the experience of the external senses combined with phenomena. Even so we are not sure in respect to truths unless, from the first end to the last, there be a consensus of all the reasons that confirm the several conclusions. Nor is it enough that we in this way confirm each particular by itself; the particulars must be confirmed as among themselves, whence results some general truth; and the generals also must be compared as among themselves, whence results a universal truth. As a consequence, at the end of all these operations it will become clear whether in each several conclusion is apparent its own truth. But if this truth is to put off the name of conjecture it is necessary, as I have said, that it coincide with all the hitherto revealed experience of the senses; and that this latter coincide with phenomena; and both with a philosophy of reason rightly connecting them all. What is now put forth in respect to the cortex of the cerebrum must be further confirmed by what will be said of the whole brain and its parts; and what is put forth in respect to the brain, by which will be said of the whole body; and what in respect to the body, by what will be said of all natural and physical things that lie outside the body;

*Paragraphs n. 1-23, nearly all autograph, contain only excerpts of which are missing from the from anatomical writers.

for of all these there is a chain consisting of its units and universals. And now to our subject.

25. From the experiences that have been adduced above, it seems to some extent to be inferable that *the cortex, so called, is the noblest substantial of the brain, the individual parts whereof are woven of arteries which have terminated in the most delicate threads.* For nowhere is there seen a more abundant flow of arteries than in the pia mater which lies immediately over this cortical substance. Wherever the meninx is furrowed or ploughed, there is found an arteriole which presses upon the furrow and sends down an infinitude of shoots; and these, entering more deeply, and splitting into innumerable purer offshoots everywhere insert their capillaries into the interstices where some part of this cortical substance is visibly present. This is testified to by the experiments of all anatomists, especially by the experiments peculiar to Ruysch, whereby there has been discovered a new structure appended to the ends of the ramified vessels. Similar testimony is afforded by the experience of Malpighi who calls this phenomenon an indubitable truth; also by the experience of Bidloo, Cowper, and other anatomists who have made delineations of the forms of the cortex; and especially by that of Leeuwenhoek who has followed up these parts with his glasses. The fact is still more apparent when the cortical substance swells up into fungoid growths; and also when the meninx is separated from the underlying cortex. In the brains of healthy infants, this meninx is closely adherent to the cortex, and being of a dry nature, it does not readily come away except when softened by the vessels; as in cases of cerebral dropsy and hydrocephalus, when it comes away of itself; also after death in boiled and rotten brains. Hence as soon as the cortex ceases the arterial network also ceases.

26. The pia meninx does not appear to enter the parts of that substance immediately but only by the medium of the tunics of the arterioles proceeding between its two layers; for the pia mater often relinquishes the arterioles, and in the deeper and narrower places these pass off into the form of a network without any interconnecting meninx such as is

found at the surface. For this reason these networks are readily separated merely by repeated immersion in water, according to the art of the renowned Ruysch.

27. What that tunic is, which by means of the arteries is chiefly transmitted to the spherules of this cortical substance, is a matter that cannot be explored by help of the senses. From various signs, however, it would seem possible to conclude that it is the *inmost tunic of the arteries*. These arteries when they enter the cerebrum always relinquish their outer coat and also their muscular, while the inner coat is continued even beyond the meninges; and this conducts the purest blood into the cortical substance itself, and thence into the fibrils. This will be further confirmed in the Transactions on the Arteries of the Brain and Body.

28. The individual part of the cortex is, therefore, not a vessel but is made up of an indefinite number of capillaments from a single vessel. If it were a vessel, then the coloring and the red blood would penetrate to this point; but this is absolutely denied by Ruysch as against Bidloo. The infusion of blood stops at the borders; then comes an expansion, and in consequence, a weaving of the aforementioned threads. In the animal* a membrane is contextured principally of threads; these perfect a kind of web, to the end that it may there be capable of determination according to the use which it is to perform; and that the web itself may be continuous, its filaments are woven together in some certain way. Thus in each part of the cortical substance there is adumbrated a surface and a species of most subtle membrane; for in respect to figure it is determined as being spherical or oval.

29. This then is the noblest substance of the cerebrum. The arterioles approach it in the last place, and thither the vessels direct their course as it were, striving thither in great numbers and finally betaking themselves to its several parts as to a place of rest. They do not, however, here come to an end, but, having woven these surfaces they seem to go on without a break to the fibrils extended therefrom. Hence there

*i. e., "the animal body." The word includes both men and brute animals.

is a continuous promotion and flux of the vessels, now without blood, all the way to the fibrils, whose highly delicate surfaces they also constitute. There thus exists a perpetual connection, circle, and web of the entire system which, in respect to its organic parts, consists everywhere of mere fibres, nerves and blood vessels variously changed, hardened, dried out, and multiplied.

30. *Not only is this delicate expanse permeated by the ultimate ends or threads of the arteries, but in it there is also something analagous to a blood, or that purer, volatile and spirituous essence, as it is commonly called, which constitutes the blood.* Its permeability does not cease even though the red blood, contained in its own arterioles and compounded of a number of globules, has ceased; for all things in the animal are conspirable and transpirable, according to the dictum of the venerable Hippocrates [*De Glandulis*, cap. i]; and in a small number of them are contained innumerable complexities which a subsequent age has discovered. In the narrow channels of the capillary vessels the blood is easily resolved into its parts, and these parts again into theirs; for they are flexible and elastic even to their inmosts, according to the experience of the keen sighted Leeuwenhoek. There is, moreover, a most highly active force which causes such inhalations and exhalations,—of which force we shall treat in the following transaction: for the arteriole, divided into vessels of the utmost fineness, lies over the cortex with an infinitude of mouths opened towards the stamens which lead to these highly delicate maters; and the expanding cerebrum presses outwards and inwardly invites, while at the same time the continuous cavity opens itself up. But the exhalation that shall enter in, must be of an extremely fluid and at the same time yielding nature; for the stamens are of the most delicate kind, easily soluble in water into an indistinguishable pultaceous mass, and, in the cerebellum, before they flow into the cortex, having the appearance of mucus. In testimony of the same thing, we have the difference in nature between the blood of the carotid and vertebral arteries which enters the brain, and that of the sinuses and jugular veins which leaves the brain; also the urino-volatile odor of the cortex when dis-

sected; besides innumerable other signs which proclaim that the extremely delicate maters of the cortical parts are moistened by their own liquid, equally as the pia mater of the whole brain is moistened by the blood. These essences seem not only to be driven through the little capillary passages all the way to the beginnings of the fibres whereof is constructed the medulla and the nerves; but also, as obtains everywhere in the compound viscus, especially the glandular, to sweat out some part of itself into certain little openings. On this matter, however, we shall speak in the third Transaction where we also treat of the animal spirits.

31. From the above it follows that the individual parts of that substance, or the spherules, as they are called, are as it were a further effect of the purest blood, and at the same time a further effect of the meninges which immediately invest the brain. Hence it is necessary that there result forms commensurate with such purified components; and these must be of the highest perfection. When nature ascends into the purer world, that is, when she derives her substances thither, she also returns to greater perfection; and she draws nearer to her own individual forces and forms which are the principal and originary forces and forms of compounds, to the end that the latter may correspond in the least particular to their forces and the potencies and faculties thereof. How well arranged is the order and texture of the stamens in a web consisting of such parts, is clear from the transparency of each web. It is clear also from the surface which extends itself to the cortical sphere; likewise from the wonderful effects that follow,—of which we shall speak in our Physiology; and moreover from the economic government of the whole body which here receives its principles and laws.

32. Nor does it seem that nature here comes to rest; on the other hand, she goes further and produces a still purer substance of more perfect form; and this again is the cortical substance of the aforementioned cortex. In other words: *Nature germinates numerous more subtle spherules within these containing and relatively larger spherules.* For she always aspires to her final substances where she is most potent in forces; and wherever there is an opening, she skil-

fully prepares for herself a way, in order that from these substances as from centres she may be able to act into all the other parts as into peripheries. This is openly testified to by Leeuwenhoek as having been seen by himself through his lenses; it is also the conclusion of Malpighi based on a comparison of plants and seeds; moreover, we are enjoined to believe it by the rationale of the effects seen in the field of physiology; and also*

56. . . . system, or if I may so put it, as if nature erred; for from things contrary, and from the degrees between two opposites, we learn the quality of her state when viewed simply. Without varieties that come to our senses nature is inscrutable. The differences and alternate changes of things move the mind so that it is able from one thing to draw analytical conclusions with respect to another; and to reflect upon things even to their causes. Hence without the phenomena of diseases, which I have at times added to the anatomical investigations, we lack experience as to what man is capable of being and of not being; and also as to what the body enjoins upon the animus, and the animus upon the body; that is, the nature of the reciprocal effect that redounds from either one to the other.

II. THE MEDULLARY SUBSTANCE.

70.† From these transactions of the learned it is quite clear that the cortex or ash‡ of the cerebrum, cerebellum and both medullas, is the substance from which all things in the animal body derive their principles; for there the meninges and ar-

*Here occurs a gap in the autograph from p. 49 to p. 72, inclusive. Pages 49 to 56 have been torn lengthwise, and only the half leaves remain. Pages 57 to 72 are wholly lost. From n. 91 below, it would appear that these missing paragraphs (33-55) set forth, among other things, that the cortical spherules represent a cerebrum in least effigy (see 2 *Economy of*

the Animal Kingdom, n. 191-196); that they are the organs of the internal senses (*ibid.*); the little seeds of their kingdom; and little hearts (*ib.* n. 132, *seq.*) From n. 86 it would seem that the nerves also were treated of.

†Nos. 57-9 contain anatomical excerpts on the subject of the medullary substance of the brain.

‡See note on next page.

teries go off into their last subtilty, and there the fibres and nerves begin from their first subtilty; and these comprise everything that enters into the texture of the body. Therefore, he who would labor to know from causes the physical, economic, and psychological state of his body, that is, who would labor to search this out all the way to its causes, must make his start from this substance, or must by all means draw thither the thread of his labors.

71. In the cortex and ash‡ or in each of its spherules, lies the middle terminus where the artery and its meninx, changed in name, passes over into the fibre. For the highly delicate surface of the cortical spherule is seen to consist of an indefinite number of threads which are continued vessels; and according to the testimony of all experience, this surface extends beyond the spherule and clothes the fibre. Thus an indefinite number of vessels or vascular productions furnish the clothing for one fibre, just as an indefinite number of fibres furnish the covering for one vessel. Therefore, since one constitutes the other, there is in principles a connection between the two; and the artery with its meninx does not come to an end in the cortex unless at the same time it makes a beginning as a fibre.

72. In her most perfect spheres nature forms a circle of such nature that the last coincides with the first. She thus brings about a connection between the extremes, so that the means are in perpetual dependence on both extremes. This cortical substance then, which holds the place of principal, is that which all things in the body regard, and which regards all things in the body; under whose intuition, auspices, and providence is the whole complex of all that is contained in its kingdom. Any part that is not connected with it, is not a part of that kingdom, nor does it live in society with the rest. Moreover, since in this substance is the principal, all other things are principiates; or, since in it is the cause and efficient, all other things are causates and effects; and these, co-

‡Because of its color the cortical substance is frequently called the cineritious or ashy substance; but in strict usage the term corti-

cal is confined to the glands on the surface, see *Fibre*, n. 17, 58. Hence the author sometimes says "cortex and ash."

ordinated and subordinated, take up the work of their causes,—associated, supporting, middle, near, remote and so forth; as is practically demonstrated by rational philosophy in its science of ontology and physics.

73. Granting then that the points of the extremes are to be united in the spherules of the cortical substance, it becomes evident from an anatomical examination of the still tender embryo, or of the chick while lying in the egg, that the origin of all is the brain, or, in its least terms, the little brain.* From this is drawn the first stamen which is then extended to the medulla spinalis,—the latter together with the little brain being called the carina of the chick, according to Malpighi. From this proceed nerves and then the successive parts and viscera; nor is it until after some days that an arteriole and its heart appears,—the heart with its beating first occupying a place outside the thorax, and then within the thorax, and afterwards bestowing itself in the bosom of the lungs. Hence from these highly delicate brains first is born a fibre; then from the fibres arteries; from the arteries and fibres together the web of the body; after which the artery and fibre join together in the brain, as said above [n. 29].

74. The albumen of the egg wherein lie the component elements and substances, is derived to the tender little brain and medulla spinalis by the mediation of vesicles, some of which occupy the vertex of the brain and a large number the sides of the spinalis. By these superficial vessels, and also by the substance underlying the vesicles and which is afterwards formed into fibres, there is derived thither a most highly rectified juice. In the course of some hours, days, or weeks, these vesicles multiply, divide, and disappear,—namely, at the time when, in place of the vesicles, the substance of the cortex can itself transfer and receive its vegetative and nutritious juice from the placenta, now become highly vascular; and by fibres of its own determinations which it has now put forth, can continue and perfect the machine. But these matters deserve rather that experience shall speak. The experience that follows is that of Malpighi so eminent for the keenness of his sight.

*Cerebellum. The author here means the cortical spherule.

75. Malpighi says: "After 12 hours of incubation* the parts in the enlarged cicatrix became more distinctly visible. When the follicle was ruptured the foetal chick broke out, having a large head and two rows of vertebræ which formed the inchoaments of the carina. White orbicular sacculi, or vesicles contiguous to each other, extended downwards and beset the stamens of the medulla spinalis; the premordial parts of the cerebrum likewise came to view. . . . After 36 hours the head appeared turgid with the usual vesicles, together with the rudiments of the wings and the medulla spinalis. . . . After 38 hours the chick, increased in size, possessed a large head wherein were situated three vesicles. Around it were spread coverings encompassing the whole tract of the spine, which latter was composed as usual of the round sacculi of the vertebræ. Above the origin of the wings was seen for the first time the structure of the heart. I imagined I had at times seen this before, but not with certainty. . . . After 40 hours the vesicles of the cerebrum were not so evident. The heart pulsated, having received from the veins a humor colored like rust and sometimes like sere vine-leaves; for the external border of the umbilical vessels was surrounded with a somewhat thick venous circle as it were, which at its extremities opened into the heart. . . . It is extremely difficult to establish by the sight whether or not the blood is prior to the heart described above . . . but we may suppose that as successive changes in the sanguineous matter are made manifest by the color induced, so likewise the structure of the heart becomes clearly evident merely from the motion; and that it pre-existed in a state of quiescence, although inert by reason of its fleshy fibres not being rendered firm. It seems certain, however, that the ichor or above-mentioned matter which finally becomes red, antecedes the motion of the heart, while the heart with its motion antecedes the rubifaction of the blood. . . . After two days the heart, pendulous outside the thorax moved with a three-fold successive pulse. . . . After 2 days and 14 hours there were seen to emanate from the heart blood vessels which were

*Malpighi is describing his observations on the growth of the chick in the egg at various stages of incubation.

extended towards the middle of the abdomen and produced the umbilical arteries and veins. The blood was discharged into the auricle partly from the extreme border, and partly from the ascending and descending vein; by its pulse, the auricle then propelled it into the ventricle of the heart and finally protruded it into the aorta; from here it was communicated to the head, the surface of the body and the umbilicus. At this time also the vesicles of the cerebrum were irrigated with blood vessels. [After 3 days] the situation and form of the vesicles constituting the cerebrum was as follows: In the vertex of the head was a somewhat large vesicle irrigated with little vessels, and like to a hemisphere. On the following days this was divided into two quasi vesicles. In the occiput was added a triangular quasi vesicle; but the lowest part of the sinciput was occupied by an oval vesicle next to which were placed two others, etc., etc. [*De Formatione Pulli in Ovo*, in Op. Om. Ludg. Bat. 1687, p. 55, seq.]

76. There is therefore no spherule of the cortex or ash that does not bring forth a fibre as its own proper path of determination; and this is true not only of the spherule that occupies the surface of the cerebrum, but also of that which occupies the surface and interiors of the cerebellum, and of that which enters into the medulla oblongata; and moreover, of that which is in the corpora striata, the crura and thalami of the optic nerves, the testes, nates, pineal gland, annular protuberance, pyramidal and olivary bodies, and the axis of the medulla spinalis. The beginnings of the fibres are indeed as many in number as are the spherules of this substance; for whatever is predicated of the one is predicated also of the other. The same is proved also by the fact that the whole nervous propagation many times exceeds in multitude and magnitude that abundant medulla which is generated in the cerebrum and transmitted to the medulla oblongata and thence to the spinalis; and also that which is sent off from the cerebellum to the same goal. It is further proved by all the effects that flow from the nerves thus produced; and moreover it receives the assent of Malpighi, Boerhaave and others.

77. The copious medullary or fibrillar substance of the

cerebrum is expended for the most part on the members of the chymical laboratory of its spirits,—of which members we shall speak in detail below; nor is it ought but a small part that passes off by the annular protuberance,* and, on the opposite side, above the region of the testes and pineal gland. But though only a small part,—gathered, however, from the whole cerebrum,—yet it salutes, touches, and decussates with all the fibres that are begotten in the medullas oblongata and spinalis; so that not one of them does anything whatever without the consciousness of the cerebrum; or, there is not one of the fibres which move the muscles, that does not depend on the will of the cerebrum. That nevertheless the cerebrum with its own fibres emitted through the two medullas finally passes out of the vertebral sheath, to wit., when it has thus effected these wonderful contacts and connections with all the intermediates, will come to be confirmed in our third Transaction. The same applies likewise to the cerebellum and its medullary fibres, but especially to its third process or restiform body.

78. Therefore, in a machine that is thus continued and determined by fibres, no part can in any way be touched in the extremity of the body where the fibres have suitably unfolded, without at once passing on the sensation to the cerebrum. And according to the order of nature, this sensation cannot stop midway but must go on to its last where also is the first. Nor does it stop here, since there is something ulterior or prior; but by formed paths of determinations it runs on in a moment and almost in an instant to its last or first substance; that is, all the way to the centre. Thus when it flashes to the spherules of the cortical substance, it instantaneously proceeds therefrom to degrees of a superior or prior order; nor does it stop, except in the purest and most simple organ; and this is to the end that it may communicate immediately with the soul which is here rendered conscious of it. This is the reason why it is the soul that has regard to all things and is regarded by all; and for the sake of which they all exist.

*The Pons Variolii.

(*To be continued.*)

ACTION.

(Continued.)

BY EMANUEL SWEDENBORG.

CHAPTER XVII.

THAT ACTION IS AN IDEA OF THE MIND REPRESENTED IN THE
BODY BY THE MINISTRATION OF ORGANS; CONSEQUENTLY
THAT THE WHOLE BODY IS FRAMED AFTER THE IMAGE
OF THE OPERATIONS OF THE MIND.

For many ages back, diligent enquiry has been made as to the harmony intervening and coestablished between mind and body. For it is our experience every moment, that from some preceding idea of the mind the organic body rushes into acts similar thereto; showing that something which is not corporeal or not material excites this great mass to whatever action and violence it pleases. This cannot be ascribed to mere correspondence; for without an active force which is actually impressed, no action and motion can ever exist. From these premises it is evident that there is no thought without change of state; and that this change of state is effected in the cortical gland whence are derived fibres; also that the cortical gland itself must be actually expanded and constricted in order that the animal spirit may be impelled into the fibre of the cerebrum and from this into the motor fibre of the body. That the muscle actually dilates and constricts, and so moves the limbs by means of tendons, is a constant truth dictated by experience. Hence it is apparent that individual parts of the body are so framed that they act entirely according to the decision of their mind; that is, that the body is the image of the operations of the mind. This shows that when the soul is commencing to form or create her body from the ovum, she views in herself, that is, in her own ideas, these several operations as though they were already actually existent in the body, that is to say, as though the body already sees, hears, tastes, speaks, walks, moves arms and fingers, and as though the viscera, such as

the heart, stomach, intestines, already exist. Hence results an answerable organization, just as the birthmark on the little body of the infant results from the mother's imagination. For nature, which is an instrumental cause, is so furnished, as to perform obedient service in all things, to the spiritual essence; as also is the case afterwards in the actions themselves, when the body has been completely formed. Therefore in the soul, in potency, is everything that is in the body in actuality. The body itself declares every moment that it is an image of the operations of its soul.

CHAPTER XVIII.

THAT HABITUAL ACTION, WITH THE WHOLE OF ITS FORM, RE-
CURS AS IT WERE SPONTANEOUSLY, SOLELY FROM FORCE
IMPRESSED BY THE MIND; HARDLY OTHERWISE THAN
IS THE CASE WITH NATURAL ACTION.

This is apparent from speech; for the tongue, lips, throat and trachea, straightway fold and turn themselves in accordance with every word or sound that is to be articulated, and they run again into such acts as have been acquired by habit; but the acts must first have been well impressed. The same is also the case in singing. So the eye is turned to objects as of itself; and also the fingers, when they run over the strings of the harp or lyre. So likewise with the feet and soles when they walk; for having entered on a road, they go on without any further idea. Not to mention the gestures and actions of dancers, mimes, players and so forth. Still none of these actions is continued unless it has first been acquired; and then the very habit puts on nature as it were. But as to the mode whereby this effect follows, this we learn from the anatomy of the cerebrum, medulla oblongata and medulla spinalis. The cortical substance of the cerebrum sends down innumerable fibres into both medullas, and thus associates itself with the fibres proper to the latter. In this way the medulla oblongata and medulla spinalis, are bound to act at the nod of the cerebrum, that is, of the mind in the cerebrum. And when this harmony has been well established by frequent use, then, at

the first sign given by the cerebrum, the cineritious substances of these medullas rush into similar acts as though the cerebrum were commanding each separate act. As to the organism whereby this is effected, the reader may see this in the Trans-actions on the Brain.*

CHAPTER XIX.

THAT THERE IS INTERNAL ACTION AND EXTERNAL ACTION ; BE-TWEEN WHICH TWO THERE IS ESTABLISHED AN
ACTUAL HARMONY.

Internal action is thought or the action of the mind, while external action is the action of the body. Internal action or thought is carried on in the inmost parts of the cerebrum, that is, in its purest organic or cortical substances; while external action is carried on in the outmost regions, that is, in the muscles of the body. Action is a change of state; and the same is true of thought, for this is not possible without a change of the state of the cortical gland; so neither is the action of the body, which is a change of the state of the muscles, and consequently of the motor fibres in the muscles. Between these two actions, harmony is established by means of fibres which commence in the above-mentioned glands and terminate in the muscles; thus the harmony is an actual one. But as to the mode whereby this most delicate fibre with its highly yielding spirit is able to produce such great and weighty effects, this also will be understood when we consider, that in the whole muscle there is nothing substantial except the fibre; and that at every expansion, this fibre expels the blood, which is heavy, and at every constriction admits it. When this is being done in the innumerable least points of the motor fibre, and thus in the single parts of the muscles, it is necessarily being done in the whole muscle; that is, the whole muscle is actuated; for the compound derives all its force from its simple substances and forces. How small that is which moves whole bodies from their places, appearing, indeed, in the idea

*See I. *Brain*, (Tafel's translation), pp. 770, 771, 773.

of our mind as though it were nothing, may be concluded from the several effects of nature; and it can even be demonstrated by calculation.

CHAPTER XX.

THAT THERE EXISTS NO FORCE WITHOUT ACTION, NO ACTION WITHOUT CHANGE OF STATE, NO CHANGE OF STATE WITHOUT AN IDEA OF MOTION; WHAT THENCE RESULTS IS CALLED THE EFFECT.

It is a general rule, that, granted force, we have action, granted action we have change of state, and granted change of state we have fluxion, which latter cannot be conceived of without an idea of motion; and granted motion we have effect. Thus in active force as the efficient cause, is contained the sufficient reason for the actuality of the effect. The soul, or our intellectual mind, is the supreme force of its kingdom. This cannot exist without thought, which is called internal action. Thought or this internal action supposes a change of the state of the cortical gland. This change of state cannot be conceived of without a change of essential determinations, that is, of the form; nor, consequently, without a variation in the situation and connection of the simple fibres and of the other substances in the above-mentioned glands; nor, consequently, without the idea of motion. What thence results is called effect and also phenomenon. Therefore the effect of internal action is external action; and the effect of external action is that which is produced by the action and intended by the mind; thus the end is concurrent with the effect. I say that no change of state can exist without the idea of motion. It can, indeed, exist without motion, for to the existence of motion there must also be a centre, periphery, quarters, upwards, downwards, and place, none of which can be predicated of forms most simple; consequently neither can motion, though the idea of motion may. But it is an idea, which, by grace of the intellect, is fixed in such things as our senses recognize as being moved; for it is from its form that every

entity derives its being such as it is, consequently, its predicate of being either devoid of motion or partaker thereof.

CHAPTER XXI.

IN THAT ACTION IS A CHANGE OF STATE OR OF COEXISTENTS,
THERE IS GIVEN PURELY NATURAL ACTION, ANIMAL
ACTION, AND RATIONAL ACTION, THE LATTER BE-
ING THAT WHICH PROCEEDS FROM INTELLECT.

Purely natural action is, in itself, devoid of end and intellect; it is also called dead and blind action, because it does not appear to be determined by any intelligence; as, for instance, the action of the wind on the sails of a ship, of the waves on a rock, of light on the eye, and many others of the same kind. To the number of purely natural actions must also be referred the action of gravity. Animal action, on the other hand, is called instinct, which is also found in ourselves. This action does, indeed, proceed from an intelligent source or soul; but because the action follows from a certain necessity, and its mind is not rendered conscious of it, it is called purely animal. But rational action is adjoined to some end which is foreseen and intended; consequently it is done with foresight and deliberation and is called *proæretic action*,* meaning that we see the end before the effect, or the end so conjoined to the effect, that the effect is regarded as though it were nothing without the end.

**Proæretica* is a compound respectively, *before* or *in preference*, from two Greek words, meaning, *ence*, and *to take or choose*.

(*To be continued.*)

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PROBLEMS RELATING TO SWEDENBORG'S CHEMISTRY.

BY REGINALD W. BROWN.

A FURTHER CONSIDERATION OF THE DISCREPANCY IN SWEDENBORG'S STATEMENT OF THE RATIO BETWEEN THE ALKALINE CUBE AND THE ACID TETRAHEDRON.

Professor Iungerich's attempted explanation, in the October issue (pp. 251-252), of Swedenborg's statement in the CHEMISTRY that the ratio of the alkaline cube to the acid tetrahedron is 2:1, instead of 5:1, indicates very clearly the usefulness of a very thorough-going analysis of Swedenborg's chemical theories. A complete treatment of the field opened up by Prof. Iungerich's article would lead us into the consideration of a series of problems relating to Swedenborg's CHEMISTRY of a far more serious nature than those we have already touched upon in the two articles previously published in this journal. The problems analyzed were relatively simple and were considered almost wholly from the internal evidence of the CHEMISTRY itself, rather than from the point of view of the important facts of chemistry, and other related sciences, now possessed by us. It will indeed be necessary to go into these more serious problems before we are prepared to form a just estimate of the validity of Swedenborg's chemical theories, and before we will be in a position to attempt any distinctive constructive work along the lines of chemical theory. My purpose at this time, however, is only to point out several important considerations which Prof. Iungerich seems to have overlooked in the article above referred to.

To any one not acquainted with Swedenborg's CHEMISTRY

the line of reasoning followed by Prof. Iungerich might appear to be quite convincing. As a matter of fact, however, to accept some of the assumptions which are involved, assumptions which Swedenborg was very careful to avoid, would be in direct contradiction to Swedenborg's own statements and theories.

1. Prof. Iungerich accepts our calculations of the ratio 5:1 as convincing. He is "compelled to dissent" from our "tacit assumption" as to the shapes of the alkaline cube and acid tetrahedron. This assumption, however, is Swedenborg's, not ours, namely, that the balls about which the argument revolves were left alternately on the points of cubes and tetrahedrons, and that they are, therefore, equally distributed between the two, and cannot affect the volumetrical ratio in the least. Prof. Iungerich assumes that the balls or crustals of the fifth kind all adhere to the acid tetrahedrons, leaving the eight points of the alkaline cubes with concave sockets into which the balls of other tetrahedrons may be inserted. Swedenborg states that "*it is very difficult to determine exactly in which places the cavities and convexities will occur; we think that this happens fortuitously and alternately.*" (CHEMISTRY: Pt. xi, sec. 8.) Elsewhere he says that whenever particles of common salt are fractured "the fracture necessarily takes place according to the convexity or surface of some one globule [of the fifth kind]. *Whence, according as chance directs, the acids have partly hollow extremities, and partly convex ones.*" (Ib. Pt. xii, sec. 1.) Consistently with his theory, Swedenborg always diagrams both alkaline cubes and acid tetrahedrons as each having an equal number of concave and convex points or extremities. See Plates VI and VII in Strutt's translation of the CHEMISTRY, or the corresponding diagrams in the original. Prof. Iungerich's assumption is, therefore, a direct contradiction of Swedenborg's theory.

A moment's consideration of Swedenborg's Theory of Acid in Part xii, and of the combinations of acid tetrahedrons which he there describes, indicates very clearly the reason

why he thought that the ball was left *alternately* on the points or spicules of the alkaline cubes and on those of the acid tetrahedrons. Such equal distribution of balls and sockets on the acid tetrahedrons would make it possible for these tetrahedrons to be conjoined with each other as well as with the cubes from which they were originally broken. Prof. Iungerich is driven to the expediency of supposing that the acid tetrahedrons subsequently lost a sufficient number of balls from their extremities to allow for combination. This theory does not seem quite so reasonable as Swedenborg's, since it would make it more difficult for the acids to combine again with the cubes.

2. The assumption on which Prof. Iungerich mainly relies, that the corrosive action of the acid tetrahedrons requires that all four of their pointed extremities should be armed with balls or crustals of the fifth kind seems to indicate a misconception of what Swedenborg meant by the "pointed portions." Prof. Iungerich identifies the pointed portion of spicule with the ball or crustal of the fifth kind, but Swedenborg does not so identify them, since he speaks of these pointed extremities as being either concave or convex. We would point out the fact also that the alkalis have a corrosive action as well as the acids. It might, therefore, be reasonable to conclude with Swedenborg, if Prof. Iungerich's assumption were true, that there was an equal distribution of balls on the pointed extremities of both cubes and tetrahedrons.

3. Prof. Iungerich's mathematical calculation based on the assumptions already referred to, is very ingenious, and might appear to carry some weight were it not that it entirely disregards Swedenborg's own theories relative to the volume and weight of the crustal of the fifth kind. This crustal of the fifth kind it is that answers for the ball in Swedenborg's theory, and is assumed to be identical with the "spicule" in the theory of my colleague. According to Prof. Iungerich's calculation a single ball or crustal of the fifth kind would have the exceedingly large relative volume of $\frac{1}{8}$ (i. e. $\frac{3}{56+4 \times 28}$) of the complete salt particle. According to Swedenborg the

diameter of the crustal of the fifth kind is $\frac{1}{10}$ that of the water particle. The volume of such a particle would, therefore, be $\frac{1}{1000}$ that of the water particle. The volume of the primitive salt particle being to that of the water particle as .39578:1, the volume of the crustal of the fifth kind would, therefore, according to Swedenborg, be approximately $\frac{1}{400}$ that of the salt particle, instead of $\frac{1}{60}$ as calculated by Prof. Iungerich. In other words, that latter value is nearly eight times as large as the former, a value which would seem difficult to account for without further considerable modifications of Swedenborg's theory.

Furthermore, Swedenborg states that the weight as well as the volume of the alkaline cube is to that of the acid tetrahedron as 2:1. According to this if Prof. Iungerich's calculations were correct the weight of the crustal of the fifth kind would also be $\frac{1}{60}$ of the whole salt particle. Whereas according to Swedenborg's assumptions and calculations the weight should be approximately only $\frac{1}{800}$ that of the salt particle. This is the result that we would arrive at if we allowed that there are 300 fifth crustals in the surface of a water particle, a conservative estimate it would seem. On this assumption a crustal of the fifth kind would weigh $\frac{1}{300}$ of the water particle. Swedenborg calculates that the salt particle weighs to the water particle as 25:9, or that the former is $2\frac{7}{9}$ times as heavy as the latter. This would make the weight of the fifth crustal less than $\frac{1}{800}$ that of the salt particle. This value is about $\frac{1}{16}$ that which would have to be assigned by Prof. Iungerich, and would by no means justify our accepting his conclusions as a valid explanation of the discrepancy in Swedenborg's calculations.

A SERIOUS MECHANICAL DIFFICULTY.

There are many mechanical difficulties in the working out of Swedenborg's chemical theories. There is one that it seems useful to refer to here since it bears directly upon an essential feature involved in the above discussion, namely, Swedenborg's theory of ball and socket jointing of chemical particles. Various modifications of this theory were prevalent

in Swedenborg's time. Swedenborg himself while working along the same general lines as his contemporaries far surpassed them in the detailed working out of his mechanical theory. But notwithstanding the superiority of Swedenborg's scheme and its relative plausibility especially when measured side by side with other similar schemes, he left many fundamental questions unanswered.

Why in the first place should it happen that the extremities of either acid tetrahedrons or alkaline cubes such as Swedenborg supposed to be formed should be terminated by single crustals of the fifth kind? This is very difficult to answer on the basis of such mechanical principles as are laid down in Swedenborg's *CHEMISTRY*. The assumption that such a thing should happen is purely arbitrary. When we examine the cross section of the triangular region between three contiguous water particles, where this fifth crustal is said to be placed, we find that there is ample room for three fifth crustals. On purely mechanical principles such as Swedenborg supposed, it would be far more natural, if not inevitable, that the cross section be occupied by three such particles. To imagine only one particle, and that centrally placed in so large a space, and always occurring at the same plane in the case of other similar zones of fracture, would involve very serious mechanical difficulties.

Difficulties would still remain if we assigned three balls and sockets to each joint. For what would determine that they should all occupy the same plane, or that the plane should be similarly placed at all zones of fracture, conditions that would be necessary for the tetrahedrons to be mutually interchangeable as demanded by Swedenborg's theory.

To put all this mechanism on the basis of chance, as Swedenborg does the retention of fifth crustals at the extremities of the cubes or tetrahedrons, is altogether inadequate to explain the laws of chemical combination as we now know them. The more we examine into the details of Swedenborg's chemical system the less do they seem to measure up to the ideal mechanical system which he foresaw actually exists in

nature, and which abundant later chemical experience has established beyond a doubt. In their last analysis the details of Swedenborg's chemical system were necessarily crude, far in advance as they were of his own time.

Our consideration of the ball and socket theory of combination goes to show that the problem discussed by Prof. Iungerich is not so simple as might at first appear.

ACTION. (*Continued.*)

BY EMANUEL SWEDENBORG.

CHAPTER XXII.

THAT RATIONAL ACTION IS ACTION WHEREIN AN END IS INTENDED AND AT THE SAME TIME FORESEEN; AND WHICH IS FREE, AND THUS COMPLETELY REPRESENTS THE IDEA OF THE MIND.

An effect does not follow from rational action unless for the purpose of there being an end in the effect, or of the action being for the sake of an end. True intelligence, which is spiritual, regards solely the end for which.* Thus the animal kingdom and the corporeal system has been formed that it may exist, not for mere action, or for the effect of action, but for an end. For the soul is in the intuition and state of ends, while its body is in the representation of effects wherein are the ends of which the soul has intuition. The effect is physical and corporeal, and is accompanied with motion, but the end is spiritual and without motion. In order therefore that there may be an end which shall be produced in action, and that the action may be rational, it is necessary that the election of the end be free. In the absence of election and freedom, we would have necessity, whence comes animal or purely natural action, such, namely, that the subject is bound to act in a certain way and in no other,—which is neither rational nor voluntary. But, to resume: When action is final action, that

*i. e., for which it initiates the effect.

is, for the sake of an end,* this end so rules in the action, that the physical element which promotes the end is almost ignored. Moreover, we are so formed that we are profoundly ignorant as to the mode whereby the mind's idea and the will, flow into action; so formed, namely, that there is nothing to hinder the intuitions of ends from becoming actual. From the above it follows that human actions are to be considered as spiritual and not as corporeal.

CHAPTER XXIII.

THAT NO ACTION EXISTS EXCEPT FROM SUBSTANCE; CONSEQUENTLY AS THE SUBSTANCE IS, SUCH IS THE ACTION;

THUS THE SUBSTANTIAL FORM COINCIDES
WITH THE FORM OF THE ACTION.

Internal action is the action of the cortical gland and its fibres; thus it is the action of a substance. External action is the action of the muscle and its fibres, consequently it also is the action of a substance. Whether the substance to which the action is attributed be simple or compound, it must be conceived of as consisting of an infinitude of individual or more simple substances which by their fluxion represent some form. For in the very nature of things there can be no substance without form, nor any form without the idea of fluxion. Consequently as the substance is, such is the form, and the substantial form coincides with the form of the action. This is the reason why, from the form of the action, judgment can be made as to the form of the substance, and *vice versa*. The muscle cannot act otherwise than agreeably with its form, that is, according to the connection, situation and quality of its motor fibres, belly, tendon and membranes. But for the form of an action to be perfect, and agreeable with the idea of the mind, it should be possible to command the fibres of one muscle and, at the same time, some fibres of another, and so of several; from which muscles when thus excited, results a compound action which represents a new form of action.

*Quando actio est *finalis* seu propter *finem*.

CHAPTER XXIV.

THAT ALL THE SUBSTANCES OF THE ANIMAL BODY ARE ORGANIC,
AND ARE SO FORMED, SUBORDINATED AND CO-ORDINATED,
THAT THEY CAN PRESENT IN ACTION ALL
POSSIBLE IDEAS OF THEIR MIND.

The very formation of the animal body plainly indicates what forms of action can be produced. For the organic body is created solely to the end that it may live in acting, and act in living, conformably with the operations of the mind. The lungs are created, for the purpose of breathing, of drawing in the elements of the atmosphere, and of accommodating themselves to every sort of action; the heart for the purpose of impelling the blood into circulation; the arms, feet, fingers, toes, shoulders, etc., in order that we may act as dwellers on the earth. So likewise in the other parts of the body; from all and each of which, it is clear that substances must first be formed, and all for a use which the mind foresees and intends. For the soul regards actions as ends, or as means from which come ends; and she suitably ordines substances as instrumental causes in order that such actions may flow forth obediently to her decision. Thus, regarded as to actions, the body is the genuine image of the operations of its mind.

CHAPTER XXV.

THAT ACTIONS ARE MORE PERFECTLY RATIONAL IN PROPORTION
AS THE MIND IS ABLE MORE PURELY TO REGARD AS
ENDS, THE ACTIONS OF ITS BODY, AND THE EF-
FECTS OF THOSE ACTIONS,

It is truly rational to do nothing except for an end; for to regard ends, and, by actions, to intend and promote them, is the gift only of an intelligent being. We are both spiritual and corporeal or material. The spirit regards bare ends, and when it regards these, effects follow spontaneously; for nature

is so prepared as to serve the intelligent being as an instrumental cause. But nature is the handmaid of spiritual essence, or of intelligence; for an inferior form is subordinate to a superior, and the former is produced by the latter, thus the body by the soul, in order that it may perform obedient service to it. When the spiritual dominates, then what exists in the action is also spiritual; and so also the reverse. But a careful distinction must be made between rational ends and natural ends. Truly rational ends, are such as regard the welfare and happiness of the soul; but natural ends are such as regard the delights and comforts of the body. In the former no effects are foreseen except by an idea fixed in earthly matters, and by faith; but in the latter they are foreseen because they are pleasing to the external senses of the body.

CHAPTER XXVI.

THAT ACTIONS ARE MORE PERFECTLY RATIONAL IN PROPORTION
AS THE MIND VIEWS AND COMPREHENDS A GREATER NUMBER
OF MEDIATE ENDS CONSPIRING TO THE ULTIMATE
END, AND DISPOSES AND ORDINATES THEM IN SUCH
WAY, THAT THE ULTIMATE END MUST
NECESSARILY FOLLOW.

This is called prudence. There are some who include in one simultaneous view, only a minimal number of ends, and who seize upon mediate ends as the ultimate; and there are others who regard no end in all nature as ultimate, but only as an end mediate to some ultimate end beyond nature. The latter, and consequently their actions, are more perfectly rational. To comprehend or view simultaneously many ends that terminate in nature, is the gift of the intelligent; but to comprehend spiritual ends, or the ends of ends, is the gift of the wise. The former is human, the latter divine, since it must be accounted as a gift from God. Of ourselves we are intelligent, but not wise.

CHAPTER XXVII.

THAT THERE CAN BE NO PURELY RATIONAL ACTION EXCEPT SUCH
AS PROCEEDS FROM THE ALL-WISE OR GOD, AND HIS
PROVIDENCE.

Action can no more be predicated of God, than motion, of the soul; for God is above all action, though without him there is no action. There is no action without change of state, and no state without form. In God there is neither form nor state, still less change of state, for all these predicates are far below the divine essence. We could never conceive of action or change of state in the soul without the idea of a fluxion of parts, and without an idea of motion, and yet the soul is without parts and without motion. How then can we conceive of and express the divine essence, which is as far removed from the predicates of action, as the action of the mind, from the predicates of motion! But since God is wisdom itself, and since he is the end itself, from whom, by whom and for whom are all things, and the universe is the world of the effects of his providence, so it follows that there is no action, even natural, which does not descend from Him; for in God we live and move and have our being. Thus that action is purely rational which proceeds from the all-wise and his providence.

CHAPTER XXVIII.

THAT MANY ACTIONS ARE SIMULATED, AND DO NOT CONFORM
TO THE IDEA OF THE MIND; BUT THAT, NEVERTHELESS,
BY MEANS OF THE FORM OF A NUMBER OF ACTIONS
RECKONED TOGETHER AN INTELLIGENT OBSERVER
CAN FIND OUT WHAT MIND LIES WITHIN
THEM.

There are many ideas of the mind, both successive and simultaneous; many also are carried to the will. But only those are determined into act which are means to an end already foreseen and appointed. The others do not come out, being regarded as contrary to the end. Therefore, although the mind thinks one thing, and in the body does another, yet

the action does not cease to be the mind's idea, though diverse from that idea which is nearest to the end. Nevertheless the idea does come out, if the actions be rightly scrutinized one after another, or if they be reduced into a species of equation and the idea of ideas be thence evolved analytically. But to do this, is the part only of one who is intelligent and sagacious.

CHAPTER XXIX.

THAT SO LONG AS WE LIVE IN THE BODY, OUR VOLUNTARY OR RATIONAL ACTIONS ARE NEVER PURE, BUT MIXED.

Our intellect is not pure, nor, consequently, our will which is the summing up of our intellectual ideas or thoughts. For we perceive hardly anything more than what is insinuated into the mind, and communicated thereto, through the doors of the external senses; and we have hardly any desire except for such things as are pleasing to the senses and the body, which are terrestrial and natural. And because we desire natural ends, whence come the cupidities of the animus, the desires of the ends of the mind must needs themselves be impure. The spiritual which is within the intellect, hardly declares its presence except by contemplation alone; so involved is it in material ideas, that scarcely ever is this spiritual the desire that determines the will. When there is such a mingling in one and the same mind, our will or action can never be termed pure. This also we have evidence of in the state of our own body; for our will and its forces, our desires, namely, and cupidities, destroy the economy of the body and precipitate it into disease, old age and death; it is the spiritual alone which restores the fallen parts.

CHAPTER XXX.

THAT THE THOUGHTS OF THE MIND ARE CONCENTRATED IN A CERTAIN WILL WHICH EMBRACES THE IDEAS OF THAT MIND, AND TO WHICH THE ACTIONS OF THE BODY CORRESPOND.

The series of our rational mind and its operations is such, that we first perceive the images of the senses; then we turn

them over on all sides and revolve them, that is, we think; then also from the stores of the memory we draw out many like ideas; after this we combine these scattered ideas of the thoughts and reduce them to a certain form, this operation being called judgment; we then conclude that the ideas of the mind concentrated in the judgment must be determined into act, or be represented by means of actions; this is called the conclusion, and to this conclusion a certain force is added, in order that it issue forth into act; this conclusion is called the will. Within the will therefore are concentrated as it were, all those things that were within the thought and judgment. and, in addition, a force which acts continuously in order that the will may be determined into act.

CHAPTER XXXI.

THAT THE WILL CAN BE COMPARED WITH CONATUS, ACTION
BEING THEN COMPARED WITH MOTION.

An action which does not flow from the will, or within which there is no will, is not a rational action, but an animal action or a natural action. Therefore, the will is perpetually present in rational action, like conatus in motion. With the ceasing of the will the action ceases; or, as the will is, such is the action; exactly as in the case of conatus and motion. This also is the reason why action is never regarded physically according to the form, but according to the will, that is, according to the ideas of the thought, and according to the intention or end. The action of one man may be exactly like that of another, and yet it is not like, if the will does not in like manner correspond to the action. Therefore, as conatus is in respect to motion, such is will in respect to action.

CHAPTER XXXII.

THAT WITHIN THE WILL REGARDED AS CONATUS, THERE ARE
DIRECTIONS AND ALSO VELOCITIES OF ACTION
REGARDED AS MOTION.

This is declared by experience. With previous will we can direct our actions to any object whatsoever, and to any effect

and end; so likewise we can determine them with whatsoever speed we choose. For to the end that a perfect form of actions may result, we are able to excite certain muscles and at the same time certain other muscles, or certain fibres of these muscles and at the same time certain other fibres. In speech this is manifest; for we can raise and lower the voice, and can accelerate or retard its progress. The same is true also in all other actions.

CHAPTER XXXIII.

THAT UNLESS IT BE RESISTED, WILL BREAKS OUT INTO OPEN ACTION, LIKE CONATUS INTO OPEN MOTION.

Conatus corresponds to will, and motion to action; so also resistance corresponds to impossibility. For force consists in continuous conatus to action, and from force action constantly follows, unless there be resistance thereto. Impossibilities, of which, as of resistences, there are degrees, are the resistences that curb and limit the will.

CHAPTER XXXIV.

THAT THE CREATOR OF THE UNIVERSE HAS SO PROVIDED, THAT, ALTHOUGH INDIVIDUAL PARTS ENDOWED WITH FORCE, ARE IN THE CONATUS TO ACTION, NEVERTHELESS THERE IS RESISTENCE TO THEIR ACTING IN ANY OTHER WAY THAN AGREEABLY WITH THE ORDER OF NATURE. SO ALSO IN THE ANIMAL WORLD.

Every individual part of the air and ether is endowed with its own force, but is resisted by the associate and neighboring parts so as not to act except agreeably with the order of nature; hence comes the equilibrium of all things in nature's universe. So likewise in the animal microcosm. The will is like conatus; and this will is more or less coerced by impossibilities, from breaking out into act. In order therefore that resistences may be offered to human wills, an infinity of means has been provided by the Creator of the universe; of which

I need mention only civil laws and the form of society, which are provided so that none shall dare to go beyond the bounds of his own sphere.

CHAPTER XXXV.

THAT THE FORCE WHICH IS WITHIN WILL, FLOWS FROM THE
DESIRE OF SOME END, WHENCE COMES ACTION.

Without the desire of an end there can be no will. For in order to the existence of will there must be force within it. This same force, or this desire, rules also in the thought and in the judgment. Those therefore who are devoid of all desire, are also devoid of will. The desires of the mind are for the sake of an end, while those of the animus, are cupidities, and those of the body, pleasures. Over all these preside the desires of the soul, which are pure loves. Thus the heats and fires, nay, the lives of our actions, both internal and external, are mere desires, without which, we neither live in acting, nor act in living.

[THE END.]

ON THE SOUL AND, IN GENERAL, ON THE
HARMONY BETWEEN THE SOUL
AND BODY.

BY EMANUEL SWEDENBORG.

I.

[1.] *The mind never really acquiesces in any system respecting the commerce and harmony of mind and body, which supposes the unknown and incomprehensible.* In every subordinate series of causes, from the first cause to the final event, nothing must be assumed that is not a matter of indubitable credit and ascertained truth. If one single ambiguity interrupts the chain, the whole series dependent thereon, and the final conclusion, is likewise ambiguous, that is, of doubtful credit. If a number of unknown or occult links are inserted into the chain, then, at its end, there is still greater ambiguity respecting the induction that has been built up. Hence a single intervening link consisting of the unknown, not only begets and composes an indistinct and confused general idea, but also makes the whole series a matter of question. From things uncertain comes the uncertain. According as the lowest part or foundation of a house is, such is the superstructure or the subsequent part, that is, the part that rests upon it. According as the first or middle link in a chain is, such is the strength and power of the subsequent links which enable the chain or its last hook to bear the weight. From the weakness of a single part the whole chain becomes void of strength; just as the quality of a preceding term in a syllogism determines the nature of the conclusion following therefrom. The major and minor premises must first be demonstrated before aught else can be valid; for the validity of the consequents is exactly equal to the validity of the premises. If, among the numbers forming a calculation, there be a single one that is unknown, the sum or quotient obtained or deduced from these uncertain numbers remains of the same character; for the

error that creeps into the aggregate or product is equal to the error obtaining in the numbers. In the case of harmony, if there be one dissonant, the whole is frequently discordant. In a word, the conclusion and end has respect to all the premises, that the effect may be like to its causes. If, in the means, there does not stand out some likeness of the preceding causes, either the end is placed in doubt or it is assumed. Or if, in the progression of means to an end, the connection and quality of the causes does not become clearly apparent, all hope of the future effect is lost. Hence arise so many hypotheses; because, in the analysis of causes, things uncertain are assumed as certain, and the soul clings to the image of things occult as to the appearances of a dream. Therefore, these hypotheses are rejected by the same law as that by which they are acknowledged; and as much credence is given to an hypothesis that weakens and denies, as to one that affirms and assumes. A truly rational mind, however, never depends on the lips of a speaker, but on the truth of his sayings. To such a mind the authority of the speaker is valid exactly according to the truth of his sayings. The soul—the perpetum mobile as it were of its machine—continually agitates the fibrils of its organs, and hence strikes off, or brings forth as from a full horn, images and signs; and none others indeed than such as are like——

(Here one leaf or two pages is missing from the manuscript.)

[2.] ——to advance step and raise the standard. But because the judges themselves depend on their ideas and images, and the ideas and images on their internal sensory organs, and these latter on their external organs and the senses thereof, and the senses on their visible world, therefore we can foreknow and divine the nature of the opinion that will prevail. For it is put forth and pronounced in accordance with the comprehension and favor of the vulgar, and by a judgment formed from the ideas of the organs. These organs are ignorant of all that does not come within the sphere of their sensation or perception. From these as from wit-

nesses, that is, from the testimony of their utterances and arguments, the mind decides and concludes that everything that is within the last ray and unit of the sensation of these same organs, is the most simple of all, and has derived its origin from nothing; and thus that the soul itself is a substance not compound but simple, because its quality is inaccessible by way of the organs of our senses. This opinion is applauded and subscribed to by the vulgar; and there are some who even add threats, and engage in verbal assaults, and bite with leonine tooth, if anyone attempts to gather knowledge beyond the vulgar limits, or if he is not friendly to their side. It is not unlike as in the olden days when the learned began to suspect that the earth is not supported by columns nor stands immovable in the centre of the heavens, but rotates around its axis and is carried around the sun in its annual gyration, the sun being quiescent in the centre of his vortex; or when the sagacious mind, penetrating beyond the appearance before its senses, concluded that the antipodians are pressed towards the centre of the earth equally as are we who are antipodes to them; and that all the radii proceeding from that centre are perpendicular. But they who do not seek to be more learned than their senses proscribe such knowledges, and strive to forbid and prevent the philosopher from approaching their altars and hearths, being desirous that penetration shall go no further than is allowed by the testimony and arbitrament, as it were, of the senses; and that the bounds of wisdom and of our knowledge shall be set within a sphere that is purely animal, and is far removed from the human and rational.

[3.] But at this, the soul is justly indignant; nor does she suffer herself to be deluded and imposed upon by her senses. She spurns every occult quality, and rejects a system that rests on qualities that are meant to be unknown; and she takes it ill that she must forever live among the ancient philosophers, nor ever learn how to shake off the yoke of ignorance. Hence, when the darkness has been dispersed she begins to speak with herself in this wise: "Whatsoever be

the system of which thou art the founder, unless thou give evidence and demonstration, thou art deserving of no credit." All else she regards as the shades and dreams of Morpheus; though she may look up to and praise an author who has dreamed cleverly and to some purpose.

II.

[4.] *The mind does not acquiesce in the system of Pre-established Harmony because it involves elements that are unknown and incomprehensible, and qualities that are occult.* We may dismiss the system of the old philosophers, that is, of those belonging to an age now sinking to oblivion—systems which in part are abolished and have become antiquated by time, and in part, still draw breath. If I should devote my work to the evolving and recounting of these systems I would be playing the part of Sisypus and rolling the same stone that our modern authors, and especially their immediate predecessors who adored the urns and ashes of the ancients and embraced them with kisses, have so often turned over. There are some who deem themselves to be wasting no labor when they devote their task to such matters, and these the reader may consult if he pleases. At the present day, however, there are others who endeavor to untangle the subject of the mutual actions and reactions of the body and soul, and to make it clear, either by Occasional Causes, or by a kind of physical influx; for they suppose that the nature of the animal world, furnished with so many coverings, and steeped in such great obscurity, will thus be unswathed and laid bare before the eyes.

[5.] I do not make it my business, however, to take sides, or to express an opinion concerning either of these hypotheses, or what benefit they have contributed to the exploring of the commerce of soul and body; such labor would be of little value and barren of results. For one who is imbued and pre-occupied with his own principles is no longer in a position to perceive matters in any other way, or to have any real understanding of reasons that are opposed to his own. He is bound as it were with halter and reins, and is like a horse harnessed to its carriage which it draws along with it, but only

in the direction to which it is held by the reins that govern its course. Moreover one who wishes to formulate and build up principles by means of some geometrical and mechanical connection, and then to confirm them by experience, ought not to assume the opinions and arguments of others, and then, having assumed them, to refute the assumptions; but he ought merely to present causes, and to demonstrate the connection of his principles with the facts of experience. For unless the analytical, philosophical, geometrical and mechanical connection of principles coincide with experience, they are mere hallucinations and dreams of the brain. If, however, there be a connection, the very causes present themselves simultaneously in the connection and series, as though they were actually present, and together they so fully meet all systematical and hypothetical arguments, that to refute the latter would be wasting labor and burning oil in vain. They are sufficiently impugned if causes and connections are demonstrated. In these consists the truth which must needs be the sole truth, and which speaks well enough for itself when it demonstrates and confirms the facts of experience. In demonstrated truths there is a most powerful force, and this draws the mind away from the side of its senses to its own side.

[6.] Let us, however, find out in what respect the system of pre-established harmony, as it is called, excels other systems; and whether by its aid we may be led more deeply into the animal microcosm, and thus be allowed to enter into the more secret shrines of animal nature and to approach her oracles without the guidance of any other Delphic utterance and response; or whether this system also is like an obscure utterance, which, equally with other systems, precipitates the mind into occult qualities, that is, into obscurity and darkness. At the present day, pre-established harmony is regarded as an irreproachable answer delivered from a tripod;* it rolls on the tongue of almost all our prophets and wise men; and by it they labor to explain what is meant by the soul and its

*It was from a tripod or three-footed stool that the priestess of Apollo gave her oracular answers at Delphi.

harmony, and by the actions, laws, series and forces of the whole animal kingdom. It is this system that now carries the day, and that takes the prize from all others. In a few short years it has lifted high its head like the cypress towering above the lowly wayfaring shrubs;† and, from the tomb of Leibnitz it is growing still higher. The system then is as follows:‡

i. That in the soul there is a unique force, namely, a force representative of the universe. This force produces all perceptions, and these perceptions have their sufficient reason in a force representative of the universe. That is, that in the soul there is a series of perceptions and appetitions and thus of volitions; but in the body, a series of motions; which two series are harmonically consentient and conspiring by virtue of the nature of the soul and body.

ii. That this force is proper to the soul, being independent of every external principle, and of the body itself. Thus, by this force, the soul produces all perceptions and appetitions in a continuous series.

iii. That the soul would represent perceptions and appetitions in the same way, if there were no body, or if no visible world were in existence.

iv. That this force is bound to observe certain laws. Consequently that there are laws of perceptions and also of appetitions. That the law of sensation contains the essential determinations of the soul; and that the law of imaginations must have some share in the law of sensation; and likewise *vice versa*. That there are also in the soul laws of appetite and aversion.

v. That God has pre-established a harmony between the soul and body, in that He has adjoined to the soul a body

†The reference is to the liburnum or wayfaring tree.

‡The summary given by our author is not directly quoted from the writings of Leibnitz, but is a presentation of his system as gathered from various of his utterances. For the convenience of the reader the translator has divided this summary into paragraphs numbered with Roman figures.

wherein can exist a series of motions consentient with the perceptions and appetitions of the soul.

vi. That He has not pre-established appetitions in the soul, but only a harmony between the motions set up in the body by means of impressions made on the sensory organs, and the perceptions of the soul; or, between voluntary motions in the body and the appetitions of the soul; but still without any real dependence on the body.

vii. That material ideas, to which sensual ideas correspond, depend on the impressions made by sensible objects on the sensory organs; and that voluntary motions, which correspond to the appetitions of the soul, depend on the motions of the nervous fluid flowing into the motor fibres.

viii. That by virtue of the mechanism of the body, material ideas of sensible objects give rise to motions corresponding to the volitions and appetitions of the soul; and this, apart from any immediate, extrinsic determination.

ix. Consequently, that from the series of motions in the body, a reason can be rendered why perceptions and appetitions arise in the soul, and why they are of a given nature rather than of some other; and *vice versa*. And that the presence of material ideas in the cerebrum contributes nothing whatever to the production.

x. Furthermore, that all these operations may be understood, without supposing any action of the soul upon the body; and that they are all effected naturally; and the commerce between soul and body can be explained in an intelligent manner by the very nature of the soul and of the body. That nevertheless, the necessity of the motions that correspond in the body to the appetitions of the soul, does not detract from liberty being in the soul.

xi. Finally, that the mechanism of the body is incomprehensible, but yet is not devoid of probability.

xii. The following also is held to have been the sentiment of Leibnitz, namely: That all spirits taken together, constitute the city of God, which is the moral world in the natural world; so that a perfect harmony is found between the physical kingdom of nature and the moral kingdom of grace.

There are many other points, but as to these the reader may consult Leibnitz himself and his followers.

[8.] It is ascertained and admitted: [i] That the soul is capable of sensating, perceiving, appetizing and willing, and is endowed with the power of producing all these as its own peculiar qualities. [ii] That between the soul and the body a certain relationship must be supposed, which may be called intercourse; inasmuch as material ideas, as they are called, are consentient with the soul's sensations and perceptions, and corporeal motions with her appetitions and volitions. [iii] That in perception lies the reason for the birth of ideas, both sensual and material; and *vice versa*. [iv] Also that the above mentioned qualities of the soul are bound by their own laws, and that on both sides there is a certain series according to which all these operations flow and succeed each other in conformity with laws; and that, in the sensory organs and the body, there come forth like modes and motions. Besides many other points which experience affirms, and which the very senses, like indicators, make manifest to the soul, inasmuch as the latter is rational and is conscious of them. The same thing is attested by the effects upon which the soul is capable of reflection.

[9.] It is known even to the foolish and those of feeble intuition—provided only their mind receives some glimmers of its light and reason,—that ideas and images are formed like to those things that enter in from the visible world by the doors or organs of the senses; and that in the organs there is a species of remote sensation, although it appears as though it were proximate; that motions are presented in the body by the instrumentality of muscles, nerves and fluids; and that for the production of all these effects there are efficient causes or active forces, and, in the causes, laws; and so forth. But what further is known? These are not occult or hidden points. They are represented to every soul by means of its own senses; and the soul must give credence to things attested and experienced, and that actually exist. These do not hinder or stay the mind that is desirous of knowing; for she

seeks to extend her wisdom beyond the field of admitted and manifest facts. She is not unaware that there is a harmony, but she would learn the nature of this harmony. She is not stirred by the words Sensation and Perception, respecting which operations, placed as they are beyond the hazard of a doubt, she is in no ambiguity. Nor is she stirred by the assertion that the soul has appetites, will, aversion and unwillingness; for nothing is of more frequent occurrence than that we will what we appetize, and do not will what we are averse to. Nor is the mind troubled by any difficulty in respect to ideas and images, these being formed suitably to the perceptions of the soul, or the perceptions suitably to them; therefore she has no doubt but that the reason of the one is contained in the other, not unlike as the reason of the quality of a causate is contained in its cause. Nor does she stop at the contention that to every affection and quality are assigned laws; because these laws, that is, the fact of their existence, are dictated to us by the variety and constancy of the mutual operations of the body and its organs, with the soul. Neither can the mind fail to acknowledge, that when the one passes over successively into the other, there is a series and connection, and a certain order; inasmuch as she knows that appetition cannot be present without previous perception, nor will without previous appetition; the very modes and motions in the sensory organs and the body, are clearly apparent from every action and effect. For the seeing of these points there is no need of our eyes being opened to the full; everyone can discern them with a side glance.

[10.] It follows from the above that sufficient efficient causes and forces must be actually present, both in the soul and in the body, which shall either create or accompany the act and effect. But the mind does not wish to dwell long on things obvious and trite. She asks, as I opine, What do they signify? whether they shew forth and explain the things which she is busying herself to learn? or, whether by this new system she is admitted into a more profound knowledge of herself? That she sensates and perceives, is known to

her, because she does sensate and perceive. But she enquires into the cause; or, it is the reason of the quality that she desires to perceive. Why then does she perceive? Is it enough for her to know that she does perceive? Poor and barren would be her faculty of reason were she merely to know that she knows! And when, by a certain series or law, she passes over from perception to appetite, and also to will, the soul feels the progression, though she knows not the mode thereof, nor the motive principle, nor even the causes that make this passage from one affection to another possible. Yet she still remains in ignorance of herself because in ignorance of causes; and she will the more remain in this ignorance according as she is the more deeply and pre-establishedly systematic. And when she enquires what harmony is, and what the nature of harmony, and also of laws, motions and forces, she is in like manner in ignorance concerning them all except as to the fact of the existence of forces, motions and laws. It does not suffice that she is conscious of them and of herself, for this is also an animal endowment; moreover it can be predicated even of the senses that they are conscious of the objects set before their organs. Her rationality involves that by means of her analytical faculty she be rendered conscious of causes also.

[11.] But the more purely and wisely the soul wishes to bestir herself, and the more strenuously she attempts to extort from herself the reason of her own operations and of those of the body, the more strongly does this system resist and struggle, and hinder her from earnest search into anything of deeper import. It straightway shuts the door, and, to the mind that is eager to advance into the sciences, it opposes obstructions and barriers, and guards every path and field with a fence lest she extend her course further; for the system defends a harmony pre-established by God, and it restrains us from going any further, since it opposes to us an occult quality. And lest the eager mind break through the fence or climb over it, the system lays down the principle that all things are carried on apart from any interdependence; and

it entirely takes away any connection between the soul and the body. The very laws and series that exist both in the purest entity, that is, in the soul, and in the compound and material entity, that is, in the body, it pronounces as incomprehensible and impenetrable; and consequently, although they are natural, as being perhaps not like those which appear to exist in the visible world, and which have been reduced geometrically and mechanically into laws and rules. It does the like with regard to forces, of which [it says] there is in the soul a unique force which is called a force representative of the universe [n. 7, i]. Whithersoever the mind turns, she sees some occult quality opposing her path. Thus she is prohibited from knowing anything beyond what she chances to know experimentally. On whatsoever bank or shore you stand there is presented before you as it were an abyss, at which you shudder with horror as at a yawning sea. Thus mocking as it were, the system assures us that the soul, with all her rationality, perception and light, will be lost in occult qualities as in dense darknesses, and will suffer shipwreck as it were, if she spread her sails and leave the port; and, as is the way with those who themselves are without oars, it dissuades everyone from attempting the deep. In opposing it, therefore, I shall do my utmost endeavor to shew that the aim of this philosophy, stuffed with innumerable occult qualities, or rather with nothing but occult qualities, is to overwhelm the mind (*animus*); besides many other points which I deem it wise to leave untouched at present.

[12.] But if the streams be thus closed, and we straightway take refuge in ignorance as in a safe asylum, then all philosophy and rational psychology must stop; nor will it move one step beyond that visible world which is obvious to the external senses. It will lose all hope of ever borrowing any light from the sciences and from its own experiments, and of penetrating into causes, that is, of becoming wise. And thus it will be put under the yoke of authority and be adjudged to slavery, so that it will hardly be aware that itself breathes a freer, purer and heavenly aura. With what hatred have we not attacked the atoms of the ancients? and with

what laughter and hissing have we not saluted their occult quality? and have driven them from the stage of the learned world, and endeavored to undermine and demolish their systems and schemes? For this purpose we at this day have made it our business to adorn the whole scene with experiments and phenomena, being desirous to thus supply torches to lighten the way, in order that, from her hidden recess and den of ignorance, nature may be brought into the light. Thus, from experiments, we have striven to elicit sciences of every kind, and as it were to cover and bathe our eyes with collyrias* that the specks may be removed, or the clouds obscuring and covering the pupil be washed away. And even though we fail, we are still nourished by the hope that by our industry and study a later and riper generation will enjoy keener introspection, and make deeper investigation into the more occult sphere of nature, and into causes; inasmuch as we extend to them so many means and data for becoming wise; or so many torches shining in the darkness, and which we leave for their service and inheritance.

(*To be continued.*)

THE BRAIN.

BY EMANUEL SWEDENBORG. (*Continued.*)

79. The mode whereby modification or sensation passes over from the organs of the one degree to those of the other, and this without stopping except in the first and last, can in some measure be concluded from the mode whereby it is transmitted from the external organs to the cerebrum itself, or from the cerebrum to the cortical substance. And yet that progress hardly allows of being set forth in the customary formulas and signs; for when nature ascends or descends from one degree to another, then, with the change of clothing and

*Collyrium is the name of a use, one a powder dissolved in a remedy for the eyes which was liquor to be used as an eye wash, to be applied locally. Two general kinds of collyrias were in and the other a powder which was blown into the eye.

form which she puts on when qualified in the superior and indefinitely more perfect degree, she changes also the words expressive of the same. Thus sight, or an image like to the visual, when it goes further is called an idea and thought; and this again takes its essence from something still further, and from the rational soul. In a word, the same words do not come into use in one degree as obtain in another, even though, by analogy, the one can be compared with the other. Hence for the expression of qualities belonging to the former degree, and also of the modes whereby is effected the passage from the one to the other and so on to the purest of all, a different Ontology* must be used. The same is confirmed also by all the qualities, met with in describing the substances of ascending and descending degrees. Thus the modification existing in the air is called in the ear Sound, and the perception thereof Hearing; while modification existing in the ether, that is, in an aura of a superior degree, is called Sight; and yet the latter is circumstanced in like manner as the former, but in an indefinitely more perfect way. Again, in animal organs the modification of the auras becomes sensation; for a third element is added, which is the soul, to wit, the element of living, perceiving, understanding, etc. But of these matters we shall speak elsewhere.

80. This seems to be the reason why the parts of the cortical substance cannot be suitably called either *Vessels* or *Glands*. They cease to be vessels since they no longer carry blood but an essence purer than blood and prior thereto. Nor is the term tunic or cavity competent to them as it is to vessels; for the cortical spherule is surrounded by a most delicate pia mater, and pierced by a most subtle pore; moreover, it no longer secretes liquor but an essence suitable to the spirits; nor does it have an excretory tube but a fibre. Hence by analogy it may be compared with whatever here in its principles secures a common mode of producing an effect in the body.

*See the author's uncompleted work on "Ontology,"—to the title of which he adds the subtitle "or

The Signification of Philosophical Terms."

81. When ascent is made from this degree of the organs to one still higher, not even a trace of this world is left, although there remains an idea composed of indefinite other ideas. Still less is there a trace when ascent is made to the supreme degree where is left nothing that can be expressed. The words which we have learned are properly suited to organs of the inferior degree and to the actions and affections of the body. Hence it is not possible to signify in particular the qualities and faculties of interior degrees except by signs such as can be deduced by an analytical way from those things that preserve an analogy; or, to use the manner of speech customary with authors, which are said to be emulous of or to emulate them.

82. But to resume. Since the scarcely visible spherules of the cortical substance, that is, the spherules of the third degree, conceive and produce their own fibres, it follows that the spherules of the superior substance, or those of the second degree, also do likewise. For the entire surface of a single spherule goes off into the entire surface of the fibril extended therefrom.

83. But the inmost organic substance, or last organism, does not seem to put forth any fibrils,—and this for various reasons, to wit.: Because it is the last thing, which, when conceived, at once falls into the recipient and ambient fibres; and when dispersed and disseminated into the whole corporeal system by means of the fibres and blood, is called *animal spirit*; from which, and also from this one only and universal substance, is composed all else that is subject to the soul and its government. Hence, also, since the soul is in these, the soul is everywhere in its body. Again, the unconnected modes of the other parts do not allow that it shall fix its roots in fibres as do all other substances; and if it be so fixed, besides the fact that it can then no longer enter into the fluids of the animal, the larger compound cannot be inspired by it, as by the first, to becoming like it or a likeness of it. But on these matters the reader may consult our third Transaction.

84. It does not seem possible that this truly vital substance

or animal spirit conceived within the organs of the second degree, can be for long contained in the fibres of those organs without danger of its flying away. Hence it is consociated with a purest elementary fluid elicited from the blood in the spherules of the third degree, that is, in the spherules proper of the cortical substance. This elementary fluid, consociated with the former at the very fountain, falls into the fibres, and is called the *nervous juice*. This is confirmed by the primitive birth and production of these fibres, which at once interweave, join together, and contract; also by an examination of the members of the cerebrum and of its whole chemical laboratory of the spirits,—of which members we shall treat in detail; and also by innumerable other effects which cannot be explained at this threshold of our work.

85. Consequently there are as many degrees of fibres as there are of organs, excepting one. The first, is that which is born and continued from the spherules of the second degree; the second from those of the third degree, that is, from the spherules of the cortical substance; the third from the spherules of the organs of fourth degree, that is, from the cerebrum as a whole,—which in producing itself into a medulla oblongata and spinalis is emulous of a grand fibre.

86. The manner in which each fibre is produced by its organ can in some measure be perceived if we suppose that in each organ the surface, contextured of an indefinite number of very minute threads, that is, the whole structure of the expanse of the spherule (with the exception of those ends which express a dew or exhalation to be mingled with the spirits in the organs of the third degree) descends for the formation of this its production and appendix; and if we further suppose, what will however be confirmed in the following Transaction, that each spherule makes perpetual alternations of animation, that is, of expansion and constriction, whence, in the most perfect spherules there must necessarily exist a mode of spiral or perpetuo-spherical contorsion and retorsion; thus there results the surface of a most minute fibre convoluted and woven of threads which flow into a spiral

form; and by such revolution it can give to its spirits and nervous juice the most suitable outlet. This is confirmed by all that we have hitherto said concerning the nerves;* also by all the anatomical effects that appear in the animal body as the products of these fibres; and by innumerable other signs, of which we shall speak in particular; moreover, Leeuwenhoek shows that he has seen the least parts of the blood gyrating around their centre. Thus the mesh of the fibre is not unlike a mesh of stamens; and the whole fabric is as it were the work of the weaver Athene newborn from the brain.

87. Meanwhile it is apparent from what has been noted, how immense is the abundance of the minute stamens and fibrils,—so immense that they well nigh exceed all number; and also how indefinite is the expansion of the surfaces of the cortical substance, which in each degree increases not only by simple progression but in a triple ratio; the surfaces, however, should be comprehended as if projected into a plane. The number immensely increases by multiplication by itself or by a like subduplication;† for it passes over from one indefinitude of the external senses to another, the subduplicate-degrees appearing at last like the differentials in infinite calculus, which, as compared with finite and constant things, are equal to nothing; although, in the mundane system and in nature, there is nothing infinite; still it may be called unassignable. If, therefore, the ultimate degree of composition be x , and the next degree be already outside the sphere of the external sense, and be equal, *e. g.*, to dx ; then the next to this can almost be compared with the differential of the differential $d(dx)$, and the next to this again to $2dxd(dx)$, and so on.‡ Similar also

*This perhaps is some indication of the contents of the missing pages 49-72; see n. 32, note.

†This word was used by the older mathematicians to express the square root. A subduplicate ratio is the ratio of the square roots of quantities.

‡The author's MS. work on mathematics makes it clear that by $d(dx)$,—in the autograph it is written dxx , but this seems to be an error,—he means the second differential of x , or d^2x ; and by $2dxd(dx)$, the third differential or d^3x .

are the degrees of membranes, of fluids, and of forces, and also of modifications,—things which now, in order to be understood, are usually exhibited by analogies and eminencies.

88. Since there is such expansion into the indefinite as it were, therefore, in the lasts there is a kind of universality. And if all other things arise from these lasts, it would seem that it is mere shadows of membranes of which, multiplied into each other, we are composed; and which, when one is added to another, become at last visible to the senses. But although they appear as shadows, and to some as ideas, they are not, therefore, nothing,—which indeed can neither be aggregated nor multiplied, nor can ever come to our senses.

89. Since, therefore, the human organism consists of mere membranes convoluted into spherules and thence into fibres, it follows that the spherules with their fibres represent the passive forces or potencies of animal nature, while the fluids represent the active forces. For a stamen without its fluid is inanimate, being neither vital nor animal; while a fluid without its stamen knows not how it shall be determined according to the decision of the soul to which belongs will and endeavor. Hence both are required if a fibre is to be called fibre and animated.

90. Since channels are constructed for fluids, and fluids are born for channels, it follows that the latter, being membranous, are merely organic, and are formed according to the potency and manner of action of their fluids; and when formed suffer themselves to be actuated according to the same. Thus as is the quality of that which acts, such also must be the quality of that which is passive to the action, and *vice versa*. Therefore, from a thorough inspection of the fibre can be learned the nature of its fluid, and from a thorough inspection of the fluid the nature of its fibre; for in their tender ages all things are fluent and suffer themselves to be formed after the image of the modification of their fluids. They thus receive that form which the fluid gives them, and afterwards they permit themselves to be acted on exactly as the fluids act. This truth is testified to by the organs of the external senses, to wit.,

the ear and eye, which have been formed according to the modes of the auras which are fluids of the world.* Hence an anatomical knowledge of the animal body is merely a knowledge of organs which suffer themselves to be modified according to forms acquired from their fluids, but which, when modified, can nevertheless react. From this it follows that in her whole world* nature knows not what an active is without its passive, nor what a force is without a substance; for nature belongs to the world* and the world to nature.

91. It was pointed out above† that the spherules of the cortical substance represent in least effigy their *cerebrum*; consequently the fibres represent in the same way the medullas oblongata and spinalis,—which latter, moreover, is the first stamen or fibre in the egg. Then that the spherules of the cortical substance are the *organs of the internal senses* through which runs the sense from the external organs; but not so the fibre unless taken together with its fluid. Also that the spherules of the cortical substance are as it were the *little seeds* of their kingdom, and the fibres from them the filaments which run through the tree, and its branches, foliage and leaves, and which, with the fluid in the filaments, enlivens, forms, nourishes, repairs and establishes that tree. And finally that the spherules of the cortical substances are as it were so many *hearts* in lesser types, the fibres from them being like arteries which convey not blood but the essential substance of the blood.

*It should be noted that by the world of nature; we have *mundus* (the world), the author sometimes rendered it "mundane usually means the solar system, or system."

†See note n. 32 above.

(To be continued.)

THE NEW PHILOSOPHY

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No. 2

NOTES BY THE EDITOR.

We call the attention of our readers to the notice of the Annual Meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION printed below, on page 304.

In the present issue we print the last installment of Swedenborg's fragment on the SOUL. In both the Latin and English editions of this work, it has appeared as one of a number of little works under the general title "Opuscula Philosophica" or "Posthumous Tracts." It is our intention to include all the works hitherto published under this title, in a work to be published in the Fall, probably under the title "Psychological Transactions," which was the title adopted by Swedenborg for at least some of these works. The volume will also include the work on the Hieroglyphic Key, and an hitherto unpublished work, or notes for a work, on Correspondences and Representations.

The fragment on the Soul contains a laudation of the achievements of Science which, while wholly justified in Swedenborg's day, is still more applicable to the scientific achievements of the past few years. "Our contemporaries (say Swedenborg) have left no way untried, nor any throw of the dice untried, in order by experiment and actual proof, to elicit the forces and causes of active nature from her world and its phenomena; and in matters of experiment the learned world is so effective that in these respects they have earned the palm of victory above the ancients." (n. 36.)

But while there has been this great advance beyond the ancient world, and also beyond the world of the eighteenth century, the more extended knowledge of nature's hidden phenomena, instead of leading to deeper knowledge of the wisdom of the creator has led in the opposite direction; and we have the curious condition that in our modern times, the greater the knowledge of the testimonies of Divine Wisdom, the greater the worship of materialism. Nay, and it is also true that with the immense advance into a knowledge of nature's phenomena has come also a greater ignorance, or ignoring, of the living human causes which animate nature. Equally true today as yesterday are Swedenborg's words: If the ancients could pass over to our age, they would indeed wonder that the present age should be so eminent in experiments and so enlightened by the facts of experience as to proclaim that nature's every measure and mode is now unearthed, or that the whole of nature with her hidden secrets and arcane mysteries is now laid open to the learned world; and that, nevertheless, excepting her face and clothing, nothing of nature, as yet, stands forth in open day; that she still lies hidden in her causes, and indeed more deeply concealed than when, in a less experienced age, she covered her whole countenance!" (n. 35.)

Swedenborg was of the opinion that enough of nature's phenomena were known in his day, to warrant the philosopher proceeding to a more interior investigation into principles in order to discover not merely nature's phenomena, but her laws and rules whereby God reveals His presence. And the subsequent trend of scientific thought from God to mere nature has justified the conclusion.

It is true that many of the most important discoveries have been made since Swedenborg's day; but it is also true, and particularly in the field of philosophy on which Swedenborg wrote most fully, that they have served only to confirm the conclusions drawn by him from the data before him. And while this is not so apparent in the case of chemistry, yet even here the discoveries of modern science have confirmed his general theory as to the constitution of matter.

A multitude of phenomena often makes for obscurity rather than for clearness. The possession of large and salient facts is sufficient to justify the construction of general philosophical principles; and without these, the further accumulation of facts is but an aid to obscurity.

"It does not appear (says Swedenborg) that there is any occasion for that infinite variety of phenomena which some deem necessary, in order to acquire a knowledge of natural things; we have need only of the more important; of such as bear directly and proximately upon the point. For it is to them that we must owe our guidance to general principles; thence by means of geometry and aided by the leading phenomena which are intermediate between the two, we proceed to particulars, etc. The remaining mass of experiments may be safely laid aside as not essential; indeed they would tend rather to divert the mind into a different course, than lead us onward. Surely a person investigating the heart would not commence with the capillary vessels and there introduce a tedious course of dissections with a view to tracing them upwards. In so laborious a pursuit he would most probably be diverted from his course into other arteries, and thus remain long perplexed and misled.

"By too great an accumulation of phenomena, not only do you defeat the desire of scrutinizing the occult operations of nature, but you plunge yourself more and more into a maze where you are misled to an opposite direction. For many things of a seemingly opposite nature may exist from one and the same first cause. After the experience of so many ages if one should desire still further knowledge, confessing that in these respects he is still in need, it is no wonder that he should be unable to arrive at the knowledge of mundane things so as to reason from principles and causes; for were he possessed of the greatest possible accumulation of facts they would serve only to increase the difficulty of attaining his end." (*Principia*, Cap. I.)

THE TWENTY-SECOND ANNUAL MEETING
of the
SWEDENBORG SCIENTIFIC ASSOCIATION.

The Twenty-Second Annual Meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION will be held in the Sunday School Room of the First New Jerusalem Society, at Twenty-Second and Chestnut Streets, Philadelphia, Pennsylvania, on Wednesday, May 14th, 1919.

The Meeting will open at 2:30 P. M.

President Lewis F. Hite will address the meeting on "The Study of Swedenborg's Science."

Any member desiring to present papers is requested to communicate with the Secretary.

It will be left to the discretion of the meeting whether an evening session be held.

All members and friends of the ASSOCIATION are invited to attend.

REGINALD W. BROWN,
Secretary.

REVIEWS.

THE MORAL AND POLITICAL PHILOSOPHY OF JOHN LOCKE. By Sterling P. Lamprecht, Ph. D. New York. Columbia University Press, 1918. Pp. 168. \$1.50.

Dr. Lamprecht's study, which constitutes No. 11 in the series of "Archives of Philosophy," published by Columbia University, is a real contribution to a better and more comprehensive understanding of the writings of the philosopher whom Swedenborg so happily called "that Englishman of fine genius." Studies of Locke's philosophy are usually confined to his epistemology or science of knowledge as given in his famous Essay, and often little is known of his teachings in their wider application. But in the present work Dr. Lamprecht takes his reader over the whole field of Locke's writings,—epistemology, ethics, education, social science, politics,—and in a sympathetic yet discriminating and scholarly way, sets

forth the guiding thought of the philosopher in its various applications.

As the author shows, Locke is by no means always consistent. When he leaves the subject of epistemology, and sometimes even in the *Essay* itself, he assumes positions not wholly harmonious with each other; or he comes to questions which he is unable to answer on the basis of his developed philosophy. But the plain "common sense" of this "Englishman of genius" refusing to be forced to an explanation where he is not clear, saves him from metaphysical tangles that have enmeshed less clear sighted and perhaps less modest thinkers. This is nowhere better illustrated than where Locke confesses himself unable to reconcile the Divine Omnipotence with human freedom; and yet he declares himself "as fully persuaded of both, as of any truth I most firmly assent to." In all cases of obscurity Dr. Lamprecht has been at pains to interpret Locke consistently with himself, and in this way, aided by his own wide knowledge of Locke's works, he has succeeded in absolving the philosopher of several teachings that have been mistakenly attributed to him.

A valuable feature of the present work, is the First Book where the author gives a lucid account of the status of moral and political philosophy prior to Locke's time, with a special study of the teachings of Hobbes and Filmer. Far from Locke being the initiator of the Deistic movement, Dr. Lamprecht shows that the beginning of this movement dates prior to Locke. Indeed the whole of the present study of Locke's Philosophical thought with its various applications, shows that though he was unremitting in the fight for freedom of thought in the religious as in all other fields, yet he was instinctively opposed to any philosophy that did not acknowledge the existence of God as revealed in the Scriptures. He was truly a Christian philosopher who, while rejecting such doctrinal monstrosities as predestination and a personal Trinity in God, was yet firm in his belief in the Word, the Divinity of Christ, and the life after death.

We warmly commend the work to all who would have a

view of the whole of Locke's philosophy,—the problems that came before his mind in his many activities; the principles which guided him in the study of these problems; and the further problems which, as pointed out by Dr. Lamprecht, are raised by his answers.

A CENTURY OF SCIENCE.

A CENTURY OF SCIENCE IN AMERICA . . . (by various authors). New Haven, Yale University Press, 1918. Pp. 458. \$4.00.

This work is published as a memorial of the hundredth anniversary of the founding of the AMERICAN JOURNAL OF SCIENCE, a journal which has the distinction of being one of the less than half a dozen scientific periodicals that have been in continuous publication for over a century. Dr. Silliman, who undertook its publication as a private venture at a time when there seemed little field for such a journal, could he again visit the earth, would look with pride on the scientific progress of the past century, and on the part which the Journal has played in this progress, particularly in the field of geology.

The volume comprises chapters on geology and related subjects, paleontology, mineralogy, chemistry, physics, zoölogy and botany, each the work of a separate author. The treatment of these subjects has "special reference to the American Journal of Science,"—indeed the book serves as a splendid classified index to the contents of this veteran journal. But necessarily, this account of the progress of science is by no means confined to the contributions made by American writers and students. In a general way the various chapters give a wide view of the whole field. And herein lies the distinctive value of the work. One of the first requisites of the student, in whatever branch of learning, is to acquire a knowledge of the work of his predecessors. "It is surprising (says Prof. Gregory in his interesting chapter on the Interpretation of Land Forms) to note the delays, the backward steps, and the duplication of effort resulting from lack of familiarity with the work of the pioneers." The writers of some of the chap-

ters even in the present work are themselves not wholly free from the charge of ignorance in this respect. For instance, in the chapter on Physics it is said that the first explicit statement that heat is a form of motion was made after the first quarter of the nineteenth century; and yet Swedenborg, in his published works, distinctly declares that heat is nothing more than the activity of the parts that make up the sun. This activity he derives from the influx of a spiritual sun, and therefore he teaches that heat is uncreate,—plainly anticipating the modern doctrine of the conservation of energy. It was Swedenborg also who, before 1730, and thus long anterior to the time postulated by a writer in the present work, showed that the centre of the earth is necessarily a solid core, and not, as supposed by his contemporaries, a molten mass.

But this ignorance of Swedenborg's contributions to science is too widespread to be surprising. It is only within recent years that his works have received serious study by the learned world, and in Sweden, where this study has been made, Retzius, Nathorst, Arrhenius and other leaders in the field of science have not hesitated to declare their amazement at the marvels they have found.

The work before us is devoted as to more than half its contents to the tracing of the progress of geology and its related subjects. At the beginning of the nineteenth century geology was almost in its infancy, and it is this science, with its many modern subdivisions, that has been most amply covered by the *American Journal of Science*; this also is the science in which, since the middle of the century, American scholarship and enterprise has made the most notable contributions to the world's stock of knowledge.

The innumerable references to the *Journal* and other contemporaneous writings afford the opportunity to the student to read for himself the reasonings of his predecessors, and thus to profit from their discoveries, be stimulated by their thought, and, not least, avoid that indifference to the labor of the past which is the invariable accompaniment of ignorance and conceit.

MESSIANIC MOVEMENTS.

MESSIAHS, CHRISTIAN AND PAGAN. By Wilson D. Wallis. Richard G. Badger, Boston, Mass. Pp. 276. \$2.00.

The author here enters upon an almost untrodden field of research, for he recounts, not only the Messianic hopes that are founded on the Bible, but also the many ways, sometimes grotesque, sometimes tragic, in which the widespread expectation of a Supernatural deliverer has expressed itself among nations quite apart from the Biblical prophecies. The presentation of the subject, is, however, very uneven. Messianic hopes in Judaism, especially after the Advent, are dealt with in detail; and the same applies to those hopes as expressed in the various Mahdi movements, and in more recent American movements. But comparatively little is said of the numerous Messianic movements in Europe and England. It is surprising also that, although several pages are given to the subject of the Second Coming, there is no mention whatever of Swedenborg.

The chapter on the Budhist movement is interesting, but all too brief. The student of Swedenborg will be struck with the evidence of the remains of a knowledge of correspondences in which the Messianic hopes of the Ancient Church were expressed, as contained in the statement that Krishna is expected "to return at the end of all time . . . in the clouds of heaven, upon his white steed" to make "a new earth and a new heaven."

The work is enriched with a copious bibliography.

LETTERS AND CONTRACTS FROM ERECH, written in the New Babylonian period. By Clarence E. Keiser, Ph. D. Yale University Press, New Haven, Conn. Pp. 42 + plates LX. \$5.00. This publication constitutes volume 1 of the Babylonian inscriptions in the collection of the Rev. Dr. James B. Niess, of Brooklyn. The publication is of special interest to scholars, in whose hands it should be a valuable contribution to our knowledge of daily life in the neo-Babylonian period. The plates are finely executed and the numerous indices by which they are preceded evidence the careful work of the editor.

Students will look forward with anticipation to the further enterprise of the Yale University Press which, as we are told in the preface, proposes the publication of the text of the Yale Babylonian collection.

GEORGE MASON, OF VIRGINIA. By Robert C. Mason, New York. Oscar A. Morgner, 1919. Pp. 56. A eulogium of one of the signers of the Constitution of the United States. Written by one of his descendants to commemorate the launching of the "Gunston Hall," a ship named after the ancestral home of the Masons. The work contains portraits and facsimiles of documents,—the latter to establish George Mason's contributions to the Constitution of the United States. In the concluding chapter, the author takes occasion to present a plan for a League of Nations, constituting in effect, a supernational.

THE LAST ENEMY. By A. Judson Pettit, Boston, Mass. Marshall A. Jones Co. Pp. 59. \$1.00. A pleasing little story, commencing in the atmosphere of a cold scientific enquiry and ending in an wholly unexpected way as a charming love story.

BOOKS RECEIVED.*

THE AUTONOMIC FUNCTIONS AND THE PERSONALITY. By Edward J. Kempf. Nervous and Mental Disease Pub. Co., New York and Washington.

ELEMENTS OF ANIMAL BIOLOGY. By S. J. Holmes, Ph. D. P. Blakiston's Son & Co., Philadelphia.

THE COMING OF THE LORD. By James H. Snowden, D. D., LL. D. Macmillan, New York.

*To be reviewed in our next issue.

"THE AURA OF A BETTER WORLD."

BY THE EDITOR.

For many years past, there have been two fundamentally divergent views with regard to Swedenborg's conception of the true nature of his first aura or element, and of its antecedent points and finites.

TWO OPPOSITE VIEWS OF THE PRINCIPIA.

According to the one view, unheld by writers in our esteemed English contemporary, the *NEW CHURCH QUARTERLY*, this first aura is purely natural, in the sense that it belongs to the kingdom of the natural sun. In this view, the *Principia* deals only with the creation of solar systems, and contains no suggestion of the prior existence of a spiritual sun or spiritual universe, nor even leaves any place for such a sun and universe.

The sponsors of this position support their conclusion by the consideration that Swedenborg commences creation from "first natural points,"—the word "natural" indicating that they are within nature; these he derives directly from the Infinite, and thus leaves no place for an antecedent spiritual. Moreover, he predicates of the points a figure of motion, or a motion that describes space; whereas, they argue, according to his theological writings the spiritual sun is the first of creation, and in this sun and its atmospheres there is not the least of space or figure. The *Principia*, therefore, is fundamentally vitiated, at any rate when regarded as a complete scheme of the creation of the universe. Even though it may contain the truth concerning the creation of natural suns and their systems, or may at least be a valuable contribution to an understanding of this creation, yet it must be completely revised, by introducing a new commencement, which shall present a new series of finitions prior to the "first natural points," and these latter must be derived, not from the Infinite, but from the atmospheres of the spiritual sun.

Opposed to this, is the view held by several writers in the

NEW PHILOSOPHY, that the *Principia* doctrine is in entire harmony with the doctrine as given in the theological writings. Not that the author had the same enlightenment in both cases, far from it. For when writing the earlier works he was still in the period of preparation for his later mission. Nevertheless, the two doctrines are in harmony with each other. Consequently, while the *Principia* makes no mention of a spiritual sun and atmospheres, yet, in the doctrine there set forth, not only is there place for these spiritual creations, but they are essentially contained in the doctrine itself.

For ourselves, we are entirely of this latter view, and it is for the setting of it forth in detail that the present article is penned.

TWO ASPECTS OF THE DOCTRINE OF CREATION.

As given in the theological writings, the doctrine of creation deals only in a very general way with the physical aspect of creation,—its *modus fiendi*. It sets forth the general principles on which creation proceeds; but of the application of these principles to the actual work of creation, little or nothing is said. The theological works are more directly concerned with the work of spiritual creation, whereby the spiritual world was filled with images of the Divine. They are not directly concerned with the exact mode by which matters and substances were created, but rather with that aspect of creation which contemplates the Divine Proceeding from the Lord, inflowing into those matters and substances, and thus producing natural forms of use, and, in the mind of man, those spiritual forms of use which fill and beautify the heavens, or the perversions of which make the tragic scenes of hell. This aspect of creation is taught in wonderful detail; but of the actual modes whereby matters and substances were created from the atmospheres, or whereby the atmospheres themselves were created one from another, the theological works speak only in the most general way. Their teaching on this subject is:

THE THEOLOGICAL DOCTRINE OF CREATION.

The Lord first created a spiritual sun, which is the "first proceeding of Divine Love and Divine Wisdom. (*Div. Love and Wis.* 151.) This sun was produced "from Himself" (*ib.* 290), by the "finiting of His infinity." (*True Christ. Rel.* 23.) The constituents of this spiritual sun "are not life in themselves, but are deprived of life in themselves." (*D. L. W.* 294.) Nevertheless, "the spiritual sun is fire in which is the Divine life." (*ib.* 157.)

By means of this sun, the Lord created natural suns, which are pure or dead fire. (*ib.*)

From the spiritual sun proceed three spiritual atmospheres, successively formed in discrete degrees, (*Influx xvi*) by a species of composition. (*D. L. W.* 190-1.) From the natural sun likewise proceed three atmospheres, formed according to the same law. (*ib.* 184.) The spiritual and natural atmospheres are alike in the fact that they each proceed, one from the other, by discrete degrees, or degrees of composition; and that each consists of "discreted or differentiated substances and least forms" arising from its own sun, and "receiving singly" and thus tempering, the heat and light of that sun. (*ib.* 174.) But they differ in the fact that the discreted or differentiated substances of the spiritual atmospheres "contain life in themselves," whereas those of the natural atmospheres are in themselves dead. (*ib.* 175.) These atmospheres "as to actualities," (*ib.* 200), that is, in respect to their actual operations, are the "active forces" by which all things in both worlds come into existence. (*ib.* 178.) The spiritual atmospheres are contained in the bosom of the natural atmospheres, which latter were created in order to bring the heat and light of the spiritual sun down to ultimates. (*Conj. Love* 235.)

The spiritual and natural atmospheres thus formed cease in their ultimates or lasts "in substances and matters such as are in earths." (*D. L. W.* 302-4); and from these they clothe themselves with forms of uses whereby uses themselves, proceeding from God, come into finite actuality, finite comprehension, and finite reception. (*ib.* 307-311; *C. L.* 235.)

The whole doctrine is succinctly set forth in a speech by Swedenborg in the other world, as follows:

"By means of the light and heat of the spiritual sun, spiritual atmospheres were created, one from another, which are in themselves substantial; and these were three in number, and hence there were three degrees of thm. . . . But since this spiritual universe cannot exist without a natural universe, wherein it may produce its effects and uses, then at the same time was created a sun wherefrom all natural things pro-

ceed; and by this sun, likewise by means of light and heat, three atmospheres encompassing the former as a shell, the kernel, or the bark of a tree its wood; and at last, by means of these, the terraqueous glob, where are men, beasts, fishes, trees," etc. (T. C. R. 76.)

It is evident that this docerine gives but a general idea of the mode whereby the atmospheres, all the way to matter, were created. We learn merely that they were formed successively and by discrete degrees, or by a mode of composition. As we have said, the theological writings deal mainly with the spiritual uses created by means of these atmospheres. The *Principia*, on the other hand, is almost entirely occupied with the actual modes whereby the successive atmospheres were created; and it is but little concerned, and that incidentally, with the spiritual uses thus brought into being.

THE NECESSITY OF A PHILOSOPHICAL DOCTRINE OF CREATION.

If, then, the doctrine of the *Principia* is in harmony with that of the theological works, the two doctrines must necessarily be complementary to each other, each supplying that element necessary to the full understanding of the other. In such case, we can see and adoringly acknowledge the Providence of the Lord in preparing Swedenborg to see the doctrine of Creation in rational light, in such way as to enable him to set it forth in a true mechanical and geometrical theory. And we can also see why, in the theological works, Swedenborg is almost silent as to the actual modes of creation,—namely, because they had already been set forth in a work available to the public.

But if there is not a harmony between the doctrine of the *Principia* and that of the theological works, then it will devolve upon the student of the New Church to search out a doctrine of the geometry or mechanism of creation that shall be in harmony with the teaching of theology; unless, indeed, he would prefer to remain forever in ignorance of the deeper arcana of creation, and to be content with the general, and, therefore, obscure idea that creation was effected by successive atmospheres proceeding from two suns; and is inspired by no effort and no striving after a more comprehensive knowledge, now made pos-

sible by the riches laid before us. But the human understanding, which, when rightly ordered, yearns ever for a nearer approach to God, will not be thus estopped; inspired by that Infinite Love of Wisdom in whose image it was created, it wishes ever to advance, that it may more clearly behold and more humbly acknowledge the wisdom of its Creator.

Nor need we rest in mere aspirations; nor hew out the first paths to an understanding of creation. The doctrine is already at hand in Swedenborg's *Principia*,—a doctrine which, at any rate in its broad outlines, is most manifestly in harmony with revealed truth.

IS IT POSSIBLE TO UNDERSTAND PRIMITIVE CREATION
GEOMETRICALLY?

It may be here objected that creation, at least as to the spiritual atmospheres, cannot be understood geometrically or mechanically. If by this is meant that the geometry of spiritual atmospheres so far exceeds the geometrical forms known to us from experience in the ultimates of nature, as to be in itself beyond the region of natural thought, we cannot but agree with the objection; but it is answered by Swedenborg himself, who shows that the geometry of his first finites and first element, though not in itself conceivable by us, can yet be seen in some idea by "eminence and analogy" if we but elevate our thought above mere matter.

If, on the other hand, by the objection is meant that spiritual atmospheres have no geometry, no mode or form of motion, then we must dissent. Those atmospheres are finite. Like the natural atmospheres, they are discretized parts of substances. Therefore, they have figure. It matters not that the figure is so sublime as to be conceivable only by analogy; it is figure nevertheless. For the parts of the atmospheres are finite entities, produced in discrete degrees by composition, that they may furnish an origin to the ultimate matters of the terraqueous globe.

Let us now enquire into the nature of the harmony between the *Principia* doctrine and that of the theological works.

THE PRINCIPIA DOCTRINE OF CREATION.

The doctrine of the *Principia* is, that the beginning of creation lies in the first natural point, produced immediately from the infinite; that these points are perpetually produced, and give rise to perpetual new creations; and that all created things continually subsist from them. (3 *Prin.* ii.) These points are in themselves infinite; but they are the Infinite finiting itself; and in his work on the *Infinite*,—published in the same year as the *Principia*,—Swedenborg identifies them with the “Only-Begotten Son of God,” or the first proceeding of the Infinite. They are called “first natural points” because they are that first motion in the Infinite whereby is *born* or brought into being the whole of the created natural universe,—the word Natural being derived from *nascor* (to be born).

From these natural points were formed the first finite entities of the universe. These are called “first finites,” as being the first of finited things. By the intrinsic circling motion of these finites, which they derive solely from the point; and also by their mutual composition, were created second finites, or the second succession of finitions.

These first and second finites exist under two conditions, namely, (1) in a free state, in which each finite moves without interference from another; and (2) in a certain order and relationship to each other whereby they are bound together. In their free state they are “actives,” being most highly active by virtue of the intrinsic and unhindered motion which they receive from the points. By reason of their bound state, bullæ are formed, which consist of second finites without and first finites within. These bullæ constitute the first aura of the universe, which, because it has an active and a passive, can receive and transmit motions, just as the ether and air transmit light and sound. This first aura is distinguished from all subsequent auras in that it is not local to any space in the universe, but is universally present throughout all creation. (1 *Prin.* vi. 50); and no part of it is produced by compression and the consequent suppression of the intrinsic motion of the points.

By means of the aggregation of the free or active first and second finites, spoken of above,—which, be it remembered, are intrinsically active from the living point or finiting motion in the infinite,—there are formed in this universal aura an infinitude of active centres. These pressing in every direction upon the surrounding aura, produce from the “discreted” forms of the latter a third kind of finite, which differs from the two former in that it is produced by compression, which suppresses or inhibits the exercise of its intrinsic motion. This third finite, therefore, regarded as a separate entity, is entirely passive, or as it were, dead.

The centres, consisting of first and second active finites, bordered by the third finites thus produced by compression, are the primitives of natural suns. Here the action of the actives upon the passives, or third finites, gives rise to a new elementary or aura, the bullæ of which are

formed of third finites without and first and second actives within; and the vortex of this new or second aura is that solar vortex which is local to its own sun, and within which the planets, yet to be born, will trace their course.

By means of this second aura, which Swedenborg calls the magnetic or celestial, there is formed, by motion the nature of which we need not here enter into, a third and a fourth aura, or the ether and air peculiar to each planet within the solar vortex.

The second, third, and fourth atmospheres, therefore, (that is, the magnetic, etherial and aerial), constitute the three natural atmospheres which have their immediate origin, not in the universal centre of life, but in the sun of some particular solar system. It should here be noted, however, that the active principle of these atmospheres, which gives them the power to produce uses when clothed with matters and substances, is solely the first aura or its constituent finites; and that the only substantial within all, from which alone they live and have their being, is the first natural point, the first proceeding from the infinite.

The last of the atmospheres, that is, the air, is finally compressed into water particles, and these into the angular particles which are the constituents of matter. Thus at last stand forth, or come into existence, these substances and matters of earth with which uses are to be clothed.

THE FIRST AURA A SPIRITUAL AURA.

Such, in brief, is the *Principia* doctrine of creation. Where do we find therein a spiritual atmosphere, or the uses of a spiritual atmosphere? The answer is plainly indicated by Swedenborg in this very work, the *Principia*; namely, that it is that first and universal aura, which is above, within, prior to the atmospheres that proceed from natural suns; and that the uses of this aura are the endowing of man with the Divine qualities of love and wisdom. In the *Principia*, indeed, Swedenborg does not call this aura a spiritual atmosphere; but we are concerned with ideas and not with mere terms. Let us, then, enter into his meaning, rather than confuse our minds with a discussion of terms.

Swedenborg's words are, "To man is given a sublime countenance, so that he can behold heaven; and he is also given a soul *drawn from the aura of a better world*, so that he is, as it were, related to heaven." (3 *Prin.* i.) And later on, after speaking of the finished earth or paradise, with its three kingdoms, he continues:

"Then was introduced into Paradise and the earth, the first man, *who was made partaker of a subtiler or rational aura*, that he might know how to render the world still more perfect, . . . that is, to produce into act things which could never be produced apart from a living being who is material and at the same time rational; who might enjoy its delights and variety; who might become wise, and thus know how to venerate, love, worship the supremely provident Deity, Author and Builder, both of the world and of man himself; whose better and lighter part, with the material superinduced thereon, might aspire to heaven itself. O happy being, born to such delights, both of the world and of heaven." (3 *Prin. xii, fin.*)

To the same effect also does Swedenborg write in the *Infinite*, where we read: "The Divine in man is the acknowledgment of God and of infinity in God, and the sense of pleasure in love toward God; and this Divine could never be attained unless, within man's body, there be given a soul *taken from a purer and more perfect world.*" (1 *Inf. xii, fin.*)

In these passages, Swedenborg speaks of the rational aura of a purer, better and more perfect world; and he says that in this aura lives the human soul, and that from it man receives those purely spiritual gifts which are the blessings of the Divine with him. This aura is also the aura of heaven; for by it, says Swedenborg, "man is related to heaven." Now this aura is specifically nothing more or less than the first aura of the *Principia*; for that work, commencing as it does with the finiting of infinity, admits of the existence of no other supreme aura. Swedenborg was a rational philosopher, and it would be alien to his whole thought to have postulated some imaginary aura, existing in a *ubi* or *pu*, and not contained within the created universe.* Indeed, in his later work, *Economy of the Animal Kingdom*, the specific identification is made by Swedenborg himself. Here he teaches, over and over again, that the soul derives its life and wisdom from the "first aura," (II, 270, 311, 338,

*In his work on the soul (published in this issue of NEW PHILOSOPHY) Swedenborg devotes a number of paragraphs, n. 73 *seq.*, to showing that the soul is "an

entity of the purest world" and is "within the circuit of nature;" and not "outside the world" as taught by those philosophers "who have banished her from the world."

227), which is the same as the "first elementary" of his *Principia*, (*ib.* 312); and which he describes as a vortex or universe "embracing and directing all other vortices or universes," "affecting the human spirituous fluid or soul," and bestowing upon it "life and wisdom." (*ib.* 272.) He further describes it as "the atmosphere of the universe, or the universe itself; in which are as many perfectly active centres as there are stars or suns,—the universe being thus divided into all these singular universes." (*ib.* 312.) This, "the first aura of the world," (he says), has no inertia, no materiality, in that materiality involves inertness and gravity, (*ib.* 161, 311); and it is "the veriest form of the forces of the created universe, to which the qualities of the inferior auras can be ascribed only by way of eminence." (I, 635.)

In a still later work, Swedenborg, referring to this same aura, specifically calls it a "spiritual aura." "There are three natural atmospheres, (he says), to which is to be added a supreme. Namely, 1. air; 2. ether; 3. the celestial aura; 4. finally, *the universal spiritual aura which is the supreme*. . . . These things have been taught in my *Principia*, where the forms of each atmosphere are treated of and delineated. This was done for the present end; now comes the application." (*Senses* 264, 267; see also *Fibre* 267.)

THE PLACE OF THE SPIRITUAL SUN IN THE PRINCIPIA.

But he goes even further than the recognition of the first elementary as a spiritual or rational aura whereby the soul receives its supreme gifts; he also indicates the means by which those gifts are bestowed by God, namely, by means of a Sun which is the centre of the universe, and far above the sphere of natural suns.

"The sun, (he says), is the beginning of motion in its universe; and ther are mediant and determinant auras, to enable it to flow, with its virtue and light, into the objects and subjects of its world; and hence, by the mediation of the first aura, into the human spirituous fluid or soul."

2 *E. A. K.* 241.)

That this sun, operating through the first aura, is above the suns of nature, is openly declared in a later passage, where we

read, "As the sun of the world flows in by mediating auras, so the Sun of Life and Wisdom flows in by the mediation of His Spirit, . . . which, therefore, is often compared with a most pure aura, as Sacred Scripture testifies." (*ib.* 260.)

He further declares that

"The one sun is within nature, the other above it; the one is physical, the other is purely moral; the one falls under the philosophy of the mind, while the other lies withdrawn among the sacred things of theology. . . . By the omnipresence and universal influx of this life into created subjects, all things flow constantly, in provident order from an end, through ends, to an end." (*ib.* 266-7.) "There are, therefore, two distinct principles, (he continues, referring to the two suns), that determine this spirituous fluid, assumed as the soul; the one natural, whereby it is able to exist and move in the world; the other spiritual, whereby it is able to live and be wise." (*ib.* 169.) And later on, he says: "The soul's intuitive ideas of ends are illumined by the life of the first cause; they are called 'representative of the universe,' in that they are actuated by the first and purest aura of the world," of which the soul is "the noble progeny." (*ib.* 290.)

To get the full significance of these teachings, it should be remembered that the constant and, frequently specific, reference, is to the first aura of the *Principia*. In that work, we learn that this first aura is compounded of first and second finites, and that the only active, living and moving principle in these finites is the first natural point. Since, therefore, according to the *Economy*, this first aura transmits to the soul the rays of life and wisdom from the moral sun, which is God; and since the motions thus transmitted, and so tempered, are and can be derived only from the first natural point; it follows that this point is that moral sun spoken of in the *Economy*. And, therefore, the first and second finites are the proximate media whereby the activity of the moral or spiritual sun is tempered so as finally to appear as the activities of the first aura, whereby man is endowed with love and wisdom.

Nor are we left to inference in this identification; for in *Worship and Love of God*, if we read the words with attention, Swedenborg makes the matter clear beyond doubt. There, speaking of the spiritual form or aura "which is above the supreme form of nature," he observes that "in it there is nothing but what is

infinite, springing from the radiation of the Sun of Life, as all the others spring from the sun of the world. And since it flows immediately from the Infinite, or from God, therefore, it is living *in se*, and is that form, (or aura), which animates the souls of human beings to the uses of their life." (I, iii, 24.) Nor should this identification be surprising. But, alas! when studying the *Principia*, our thought is so turned to the geometry and mechanism by which the various finites are formed in successive order, that we are apt to imagine that Swedenborg is there contemplating nothing but a certain mechanical composition of "points of no predication," whereby something of which we can predicate quality is at last produced.

But from the very beginning of the *Principia* Swedenborg has far more in mind than a mere geometrical mechanism. His points are not without predication, and still less are they nothing. Even in the *Principia* itself he indicates their identity with the Only Begotten Son of God, (I *Prin.* i, *fin.*); and in the Infinite this identity is plainly declared. (I, *Inf.* xiv.) Moreover, throughout the *Principia* runs the constant theme that in all the successives of creation there is but one substantial which is the all in all. To this one and only substantial, the first natural point, he ascribes the love, the design, the providence, the order, which create and eternally direct all subsequents, "for an end, through ends, to an end." But in the *Principia* he is dealing with the mode of the formation of successives whereby creation is effected; and he reserves to his later works, on the soul, to show forth the nature of the infinite *Wisdom* which thus creates and thus proceeds.

THE HARMONY BETWEEN THE PRINCIPIA AND THE THEOLOGICAL WORKS.

We are confirmed in this identification also by the teaching of the theological works where we read,

"The truth which proceeds immediately from the Lord, being from the Infinite Divine Itself, can in no wise be received by any living substance which is finite, thus not by any angel. Therefore, the Lord created successives, whereby, as by media, the Divine Truth immediately proceeding might be communicated. But the first successive from this, is too full

of the Divine to be as yet capable of being received by any living substance which is finite, thus by any angel. Therefore, the Lord created still another successive, whereby the Divine Truth immediately proceeding might be receptable as to some part. This successive is the Divine Truth which is in heaven. The first two successives are above the heavens, and are as it were belts radiant from flame, and surrounding the Sun which is the Lord. Such is the successive order, even to the heaven nearest the Lord." (*Arcana Cæl.* 7270; cf. 1999, and *Div. Wis.* iii, 4.)

Here, as in the *Principia*, the commencement is made from that which proceeds immediately from the Infinite. In the *Arcana* the teaching is that successives were created by this Proceeding; but there is no word as to the *mode* of creation. The *Principia* also postulates successives from the Infinite; but from this it proceeds to describe the modes whereby these successives were formed.

The first natural point, however, is not the spiritual sun as to its constituent or created parts, but as to its essence, which is the Divine Love and Wisdom proceeding from the Infinite, and which appears as a Man in the midst of the sun. This will become clear if we compare the predicates of this point with the teaching of the theological works.

Creation was effected by the Divine Human, which was "the Word which was with God and which was God," and which "was made flesh;" or, what is the same thing. It was effected by the Divine, proceeding immediately from the Infinite. If we may be permitted to compare this with the beginning of human action, which are "as it were creations," we would speak of it as the first intention of determination of the love, or the love going forth; this in itself, is the same as the love; it is one with the love; but it is the love proceeding, or determining itself to action. Thus we may call it the first natural point of the subsequent action; the beginning of the act, and that which, by successive progression, finally produces the act, in which it is the all in all.

This Divine Proceeding is the "finiting of infinity." For we read, "God first finited His infinity by means of substances emitted from Himself, from which existed His proximate encompassing sphere which constitutes the spiritual sun." (*T. C. R.* 33.) And again, "God finited all things by His sun, in whose midst He is,

which consists of the Divine Essence that goes forth from Him as a sphere. *There and thence is the first of finition.*" (*ib.* 29.)

Now this finiting of infinity can be effected only by motion. The nature of the motion is indeed beyond our comprehension; but we can see and acknowledge that it is the Divine proceeding to creation. The finiting motion is, in itself, infinite; yet it produces the "first of finition."

Just in the same way does Swedenborg describe his first natural point. It is the proceeding from the infinite to produce the finite; it is the Only Begotten of the Infinite; it is, says Swedenborg:

"Purely motion in the universal infinite; consequently, it is pure and total motion, a motion that cannot be conceived of geometrically." He continues, "If you concede, as you must, that there is an infinite ens; and that finites are produced by the infinite; what else naturally follows than that a first mode existed? And if it existed, it cannot be rationally conceived of as existing otherwise than in the infinite. It is evident it could not exist in a finite medium. . . . Since this motion existed in the infinite, and before the rise of finites, before the world and the rules and laws of the world, that is, before mechanism and geometry, it follows that it is not to be conceived of geometrically but rationally." (2 *Prin.* xii; cf. *Div. Wis.* viii, 5.)

What else is this but God "finiting His infinity?" The theological works speak of the finiting and of the subsequent creation of successives, but are silent as to the mode. The author of the *Principia*, not yet enlightened as to those deeper arcana revealed later, still does see that the infinite produced the finite, and that this was done by an infinite mode, which he calls the first natural point, the first point of all birth, the seed of creation. The theological works speak of the "finiting of infinity;" the *Principia*, of the "first natural point." But the question is not one of terms, but of ideas; and the ideas are one.

THE FIRST NATURAL POINT NOT REPUDIATED BY THE THEOLOGICAL WORKS.

Mistaken, then, are those who would condemn the *Principia* on the ground that creation from "points" is later repudiated by Swedenborg. (*Div. Prov.* 6; *T. C. R.* 20.) Such condemnation is the result of attending to words rather than ideas. There may indeed appear to be some justice in criticising the use of the

word "points;" but here the possible justification of criticism ends; or, if not, the criticism would extend to the theological works also.

The "points" that are condemned in the latter are dead and lifeless points of "no dimension," (*D. P.* 6), and "no predication." (*T. C. R.* 20.) But the first natural points of the *Principia* are far from being of no dimension, except in the sense that they lie beyond the realm of geometry and space. And, so far from being of no predication, they are of infinite predication.* For of these points Swedenborg predicates all the law and the order and the providence and the force which foresees, creates and sustains the universe as a kingdom of uses. He says:

"If the point be produced by motion from the infinite, there is then supposed in the Producer some Willing that it should be produced; some Acting which produced; some Understanding, in that it was produced in one way and not in another, as it was and not otherwise, in one certain mode and not in another. Thus this point could not exist by chance, or of itself, but by that which does exist of itself; in whom is a Willing, an Acting, an Understanding, and also a Providing, that the product shall be successively modified thus and no otherwise; and that, by the series, such and such contingencies shall arise and no others. For in this one and first motion of the infinite, things future and contingent can be considered no otherwise than as already present and existing." (2 *Prin.* v.)

Therefore, he defines the motion of the point as "an internal state or conatus to motion, that is, to the motion that creates, sustains and rules the universe." (1 *Prin.* ii, 13.) And in the *Infinite* he calls it "infinite wisdom, from which could proceed only that which is most perfect; so that in this first ens were present, and as it were actually existent, all things which, in respect to time, were yet to be." (1 v.)

In this point, moreover, he places the whole of Divine Providence and Providence. Providence, he holds, is not an operation of God acting without means, as the vulgar believe, namely, that "without means, God now sets the clouds between the sun and our eyes; now rouses the storm; now sends rain, and gives color to the rainbow. . . . In this way, God would be represented

*See THE SOUL, n. 71, *fin.* (p. 361 in our present issue), where Swedenborg quotes WOLFF on

"points" of no "quality" or "dimension," only to condemn him.

under the image of a finite being who operates without means, or in modes immediately proceeding from himself." But the truth is that the first natural point is the law and order of the universe, wherein is contained the providence of all contingencies; which rules in all the subsequents, and thus in the greatest and least of creation. (I *Inf.* vii.)

Furthermore, as already noted, he calls this point the Only-begotten Son of God, who became flesh. In other words, he confirms philosophically the words of John in the Revelation, and the teaching of the theological works, that the Divine Human from eternity, which created the world, also became flesh for the redemption of man.

All this is contained in rational light, though only in a general way, in the *Principia* and *Infinite*; and it is fully revealed in spiritual light in the theology.

THE SPIRITUAL SUN NOT IN PLACE BUT OMNIPRESENT.

The spiritual sun, the Divine Proceeding, the infinite finiting itself, appears to the angels, like our sun, as though it were in place and at a certain altitude. But the phenomena of the spiritual world clearly demonstrate that this is merely an appearance; for in whatsoever direction an angel turns, the sun is ever before his face; and the same would be the case if two angels were looking at each other. The truth is, the spiritual sun is omnipresent in both worlds. This omnipresence, however, is not to be thought of from space, but spiritually.

The spiritual sun is the first and inmost of all created things;—that which alone in them is substantial and living, (*D. P.* 5); that from whose omnipresence come all the laws and forces of the universe; that which contains in itself all future things as though they were present. In its essence it is the Divine Human, which appears as a Man clothed with the sun; in its constituents, it is the first, the "primitives," (*T. C. R.* 33), of that series of successives, by which the universe was created. (*A. C.* 7270.) It is from this sun that Love and Wisdom proceed to the actuation of spiritual atmospheres for the giving to man of what is Divine in him.

This sun is also the only and the perpetual source of the fire of

natural suns. The fire of the latter is not the result of combustion, but, as taught both in the theology and in the *Principia*, it is the effect of the activity of the created substances of the spiritual sun. This activity is, in itself, uncreate, being the activity of Divine Love and Wisdom, which make the spiritual sun, (*T. C. R.* 471-2, 35 *fin.*; *D. L. W.* 315); and without it, the natural sun would "collapse." (*D. L. W.* 157.) "The expanse around the spiritual sun, (we read), is not an extense; but still it is in the extense of the natural sun." (*T. C. R.* 35.) The "expanse around the spiritual sun," here referred to, is nothing more than the "primitives," that is, the first finites, created by means of that sun. They cannot be thought of from space, for they fill the created universe; yet they are within the extense of natural suns, being their soul and life. In the theological writings, this is stated as an abstract truth; but in the *Principia* the same thing is presented as it were in a mechanical aspect; namely, that the centre of natural suns, from which they derive their activity, is constituted of first and second finites; and that these are intrinsically active, solely from the first natural points, which are the only substantial and living within them.

THE LIMITED SCOPE OF THE PRINCIPIA.

But though there is entire harmony between the theological doctrine of creation and that presented in the *Principia*, yet there is marked difference in treatment. The one holds to the fore the proceeding of uses that they may crown the work of creation; the other treats of the actual formation of the atmospheres, by which alone uses can proceed; it says little or nothing of the Love and Wisdom that produces these forms and proceeds thereby. And if we reflect, we shall see that this is necessarily so. For the subject of the *Principia* is the atmospheric or elementary kingdom, or the kingdom of forces in their proceeding. Until the matters and substances of earths are created, that is, until the atmospheres cease in their ultimates, these forces,—potent though they are for Divine uses,—appear merely as atmospheres, with their motions or activities. It does not yet come to view that these motions are not dead, but are the living motions of uses in their proceeding. Before this can be

manifested, they must first be clothed with the matters and substances of earths. When thus clothed, they are seen for the first time in their reality, not as the motions of a dead sun, but as the Divine Love and Wisdom proceeding to the formation of a kingdom of uses.

But while the *Principia* is necessarily silent as to these uses, and seems to be confined to the geometrical and mechanical aspects of the atmospheres, yet its author quite evidently was not unaware of these uses,—nay, the reverse. As we have already seen, he ascribes to the first natural point the Law, the Force, and the Providence, that create and sustain the universe; and from time to time, in the *Principia* itself, he indicates that the forms and motions of the atmospheres are not merely mechanical things, but are living ends or purposes for the production of uses. And when, at the conclusion of his work, he at last reaches matters and substances, that is, “the Earth, Paradise, and Man,” then that first element, which previously he had considered in its mechanical aspect, he presents in its use, its real essence, as exhibited in man, namely, as a rational aura, a better world, and heaven itself. And afterwards, in his later works, when he comes to consider the human soul and mind, he shows in fulness that the first aura of his *Principia* is in truth the dispenser of Divine and spiritual gifts; that its activities are the rays of a moral or spiritual sun, by which God endows man with all in him that is Divine and immortal.

“There is nothing in the heavens, (says he), and nothing on earth, that does not show forth with most manifest signs the provident presence of the Deity; so that he who sees nothing in all these things is blinder than the mole and viler than the brute. Hence all those miracles, as it were, that we have predicated of the formative substance, (the soul animated by the first aura), are gifts received solely from the Divine Providence; from Him, namely,—the Author and Builder of the whole of nature, in whom we live, move and have our being,—who has so placed principles in the principles of things, that everything flows in this provisory order, and, from and under Him, is in the due ratio and respect of ends.” (1 E. A. K. 296.)

SWEDENBORG'S PHILOSOPHY HITHERTO LITTLE KNOWN.

But the question may be asked, If the philosophical works teach the same doctrine as the theological, how comes it that the open-

ing of Swedenborg's spiritual eyes was necessary? And why have not these teachings been long apparent to the reader of the earlier works?

The answer to the last question is indicated by Swedenborg himself, in a remark he made to certain angels. These angels reprehended what they conceived to be in his mind an idea of three Persons in the Godhead; but he answered them, "Enter, I pray you, more deeply into my thought, and perhaps you will see a concordance." (*T. C. R.* 27.) I have shown in another place* that what these angels saw in Swedenborg's mind was the memory of his earlier works; for in these alone is there even an appearance of an idea of three Persons. If men will read these writings more carefully, says Swedenborg in effect, they will see in them an agreement with the truth that God is One in Person. It is so also in the present case.

What has been lacking in the past is a more comprehensive and deeper study of Swedenborg's philosophical works. Though these works have been accessible to English students for upwards of half a century, yet their contents are but little known, and there has been almost no real study of them, still less any study of them in relation to each other. Look through the literature of the New Church, and see how little evidence of this study is afforded! Is it to be wondered at, then, that men are still unaware that Swedenborg, before the opening of his spiritual eyes, evidences a knowledge of profound truths, thought to have been unknown to him? truths still unknown to many students of the New Church, or which, if known, they have ascribed to the theological works alone?

THE PHILOSOPHICAL AND THEOLOGICAL WORKS COMPARED.

In regard to the second question, it is not claimed that the philosophical works teach the same doctrine as the theological, but that the teachings of the two are harmonious and complementary. The great distinction between them is indicated by Swedenborg himself, as being that the earlier works were written under the guidance of reason, and the later under Divine inspiration. Speaking of his *Worship and Love of God*, he

*See *History of Creation*, Preface.

observes that it "was written under the leading of the understanding, or the thread of reason;" and, therefore, he concluded, it must be compared with Divine revelation in order to test its truth. He made the comparison, and, as he declares, "was amazed at the concordance." (*Hist. Creat.*) We also may be filled with wonder, when we compare his *Principia* doctrine with the theology of the New Church. But it does not therefore follow that the one contains all that is contained in the other.

The *Principia* was written under the guidance of the understanding,—but of an understanding formed on the one hand by a wide erudition and profound meditation, and on the other by the acknowledgment of God and His Word. Yet, even so, the *Principia* contains only the conclusions of human reason and philosophic thought. It lacks that connection with Divine Revelation which alone can give full assurance. Swedenborg himself undoubtedly made this connection from time to time; and this in an increasing degree, as he approached his later works. In the *Principia*, for instance, he cites the words, "the Spirit of God moved over the face of the waters," and appears to identify this Spirit with the first natural point. (3 *Prin.* iv.) In the *Worship and Love of God* and the *History of Creation* he frequently identifies this Spirit with the atmospheres whereby creation was ultimated. He also cites the Scriptures to show the existence of a moral sun, whose rays are the source of life and wisdom (2 *E. A. K.* 254). But, as to the marvels of the spiritual creations by that Sun, he speaks only of those that are manifested to us in our earthly reflections, namely, the virtues and intelligences of upright souls, and their power to acknowledge God. Not yet are his eyes opened to see more of those spiritual creations which are the endowments of angels and the beauties of heaven.

And even so, Swedenborg yet marvels at his own daring in teaching of a Sun of Life. After making some comparisons of this sun with the sun of nature, he adds:

"But it is not allowed to go further into the details of the comparison, inasmuch as the one sun is within nature, and the other is above it; the one is physical and the other purely moral; the one falls under the

philosophy of the mind, while the other withdraws itself to the sacred things of theology; and between these there are boundaries which it is impossible for human ingenuity to transcend. To the mind, which is within nature, there is no way open that leads to what is beyond or above nature; nor, consequently, to the philosophy of that mind, any way that leads to the theological sanctuary. No human faculty of perception understands of itself its own essence and nature, and still less the essence and nature of a Superior Being. Let us, then, not go beyond bounds, nor defile sacred things by our reasonings. All that is lawful to do, is to touch the threshold with our lips, that we may know that there is a Deity, the sole Author and Builder of the universe and of all things in the universe; that He is to be revered, adored, feared, loved; and that the providence of our own reason is respectively nothing, while His Providence is all in all. But what His quality is, in what manner He is to be worshipped, in what way to be approached,—this it has pleased Him to reveal by His Holy Testaments and oracles. To Him be immortal glory! Only ask pardon of Him, use the means, unceasingly pray, speak from the soul, and not from a heart covetous of the world, and, surer than certainty, you will see the shrines of His grace revealed." (2 E. A. K. 265-6.)

Moreover, the comparison between the two suns is approached by Swedenborg with a certain fear, as he ever remembers that "although comparison illustrates to some extent, yet it does not teach the nature of that with which the comparison is made," (*ib.* 254); and he adds:

"But I confess that, while I am lingering on this threshold, from which the road extends almost beyond the bounds of nature, a certain holy tremor steals over my mind, and warns me to go no further. For the mind thinks it sees what it does not see, and where no intuition can penetrate; and it knows not whether what it thinks enters in by the prior way or by the posterior. And, what adds to the tremor, is also the love of truth,—which, that it may hold the supreme place, is the whole of my desire. This alone I clearly perceive, that the order of nature is for the sake of ends, which flow through universal nature that they may return to the first end; and that worshippers of nature are insane." (*ib.* 259.)

It was these "sacred things of theology" into which he then dared not enter; at the threshold of which he trembled with holy awe; it was these that were afterwards unfolded to him that he might be the medium of a spiritual revelation. He had been led by the thread of reason to see the successive modes of crea-

tion; by the same means he had been led to see that there are corresponding successives in the organic world wherein the different atmospheres find a plane, each for the production of its own uses; he had even been led to see that there is a Sun of Life, which is the centre of the universe. But he trembled with awe at this threshold of theology.

"Here, (he says), it is not allowed to go further. . . . How, for instance, the degrees of this, (spiritual), light are to be compared, (with those of natural light), as to their exaltation, force and presence; with what power, according to what laws, and in what manner the subject reflects, infracts, diminishes or intercepts those rays; opposes to them its own mists, and beclouds itself; how again, when these mists are dispersed, it emerges into the light; how it grows warm with zeal, and how, on the other hand, it grows cold; in what way it is illumined by reflection; with many other things which, as I have said, transcend the limits of the comparison,—and this because the one sun is within nature, and the other above it," etc. (*ib.* 265-6.)

When all these things, and many more, were afterwards revealed, must we not conclude that Swedenborg was amazed at the harmony between revelation and the conclusions of reason?—a harmony which, in effect, is the harmony between the kingdom of organic forms and the kingdom of uses which thereby come into actuality.

For it is a general truth with respect to Swedenborg's works that the theological are mainly directed to teaching the spiritual uses born by influx into organic forms, and deal only incidentally with the nature of the forms themselves; while the philosophical works are concerned mainly with the nature of organic forms, and the natural uses thereby subserved. The philosophy deals, for instance, with the forms of atmospheres, but the theology with the Love and Wisdom that flow by means of atmospheres; the philosophy with the forms of the human brain, but the theology with the spiritual states of man, his will and understanding. Harmony between the two teachings is everywhere apparent; nay, more than harmony,—for each gives mutual aid for fuller understanding, and this in a unique way, found in no other writings.

DOES SWEDENBORG REPUDIATE HIS PRINCIPIA?

But even while wondering at the harmony between his philosophy and Divine Revelation, Swedenborg must also have seen with humility how great was his former ignorance. Hence, when speaking with certain spirits on the subject of creation, he was led to say,

"I have long meditated on this subject, but in vain," and he adds, "but afterwards, when I was intromitted into your world, I perceived that it would be vain to conclude anything about the creation of the universe unless it first be known that there are two worlds. . . . And then I also saw that there were two suns, one from which flow all spiritual things, and the other from which flow all natural things,—the one being pure love from Jehovah God, who is in the midst of it, and the other pure fire." (T. C. R. 76.)

Some have concluded that Swedenborg here condemns and rejects as "vain" the whole, or at least a fundamental part, of his *Principia* doctrine. But the conclusion is unwarranted. For it is beyond doubt that, before the opening of his spiritual eyes, he *did* know that there were two worlds and two suns; and, more important still, that the whole of his philosophy is built upon this knowledge and inextricably interwoven therewith. The very requisites laid down for a true knowledge of creation, are the identical things taught in Swedenborg's philosophy, and in no other!

But in the philosophical works, these knowledges are put forth as rational conclusions; and the author was seized with holy tremor at contemplation of the threshold on which he stood, and beyond which his sight could not penetrate. Still, he was convinced of the truth of his conclusions, and, in his later work, the *Worship and Love of God*, he repeats them as undeniable truths,—and, indeed, he then appears to have had some spiritual confirmation of them.

But all would have been "in vain" without the revelation of spiritual truths. And surely it was this thought, rather than the thought that his philosophy was vain in the sense of being false, that was in mind when he said, "I have long meditated on this subject, but in vain!" He was beholding, not any falsity in his

philosophy, but how vain, how empty it was as compared with the light into which he had come! how far short it fell of penetrating the sacred mysteries of theology! how infinite were the things of which he had been ignorant, and for which, from the love of truth, he had so ardently prayed and labored!

We are the more confirmed in this view of the meaning of Swedenborg's words, when we reflect that, despite all the harmony between the philosophical and theological works, yet no religion, no church, no heaven, could ever have been founded on the former. Alone, these works present a philosophy which is theoretical, hypothetical; a philosophy which, however attractive to the mind, yet lacks that conviction which can come only from a revelation based on the actual opening of the spiritual world; a philosophy which, without the light of Divine Revelation, could not lead man to the Lord, could not open the interior mind to the light of heaven,—though it could, and with Swedenborg did, prepare for the glad reception of spiritual truth when this was revealed.

And this introduces us to a further consideration, pointing to the conclusion that Swedenborg was far from condemning his *Principia* doctrine. That doctrine is not an isolated thing in his philosophy; it forms the very warp and woof of his whole system, from the *Principia* to the *Worship and Love of God*. To reject it would be to reject and brand as false the whole of his philosophy; and this would mean the implication that before he could serve as the Revelator, there must first have been a complete disorganization of that organic rational mind which, during so many years, had been formed and fixed by this philosophy, (*C. L.* 524); and formed, moreover, in order that he might "be prepared to receive the doctrine of the New Church in his understanding." (*T. C. R.* 779.)

Indeed, unless Swedenborg had been prepared by his philosophical doctrine of creation, the mere opening of his sight into the spiritual world could not have brought any very deep understanding of the subject, any more than it had brought enlightenment to the prophets of old, or to John the Revelator. That Swedenborg could then be interiorly enlightened, was because his

mind had already been formed and organized by a philosophical doctrine in harmony with spiritual truth.

If we further examine the passage we have quoted above, (T. C. R. 76), we shall see also that Swedenborg there had more in mind than his own former writings. His remarks were addressed to certain spirits who had invited him to address them because they perceived that he had meditated much on the subject of creation. One of these spirits said to him:

"We also have at times been in like meditation; but we were unable to arrive at any conclusion, because there clung to our thoughts an idea of chaos as being like a great egg, wherefrom were hatched out all and single things of the universe in their order; when yet we now perceive that so great a universe could not have been so brought forth. And there also clung to our minds another idea, which was, that all things were created by God out of nothing; and yet we now perceive that from nothing nothing comes. And our minds have not yet been able to escape from these two ideas, and see creation in any light, as to how it was effected. Wherefore, we have called you from the place where you are, that you may give forth your meditation on this subject." (T. C. R. 76.)

It was to these spirits that Swedenborg said, "I have long meditated on this subject, but in vain,"—in vain, to satisfy the aspirations of those who seek spiritual light; even as his *Principia* has been in vain for the enlightenment of Newchurchmen, until illumined by the teachings of Divine Revelation. For after his intromission into the spiritual world, he perceived that it would be vain to conclude anything concerning creation unless it first be known, etc.; that is, that in order to enlighten human minds concerning creation, commencement must be made with the doctrine of the spiritual world and the spiritual sun.

And may we not conclude that Swedenborg then also felt humble gratitude to the Lord, that, though many things had been hidden from him, still he had been led to see that there is a spiritual sun which is the centre of life to the universe?

THE PHILOSOPHICAL WORKS A MEDIATE REVELATION.

Do we, then, make the *Principia* and its companion works a Divine Revelation? By no means. Without the theological works, they do indeed enlighten the natural mind, and find

harmonious assent in the reason; but they leave the spiritual mind, which aspires to enter into the perception of the truths of theology, longing in vain for spiritual realities, for spiritual convictions, and not merely philosophical reasonings, however acute. The mind continues its studies, ever in the hope that it will reach the soul, and see revealed to its gaze the glory of God's spiritual kingdom. While it beholds the many tokens of Divine Wisdom displayed in the macrocosm and microcosm, and marvels at them, yet it desires with longing to set aside the veil that hides the kingdom of heaven. All this reasoning concerning the creation of the universe, concerning the soul and its operations, concerning the Sun of Life, leaves it still longing, still unsatisfied. Philosophy seems vain, so long as it rests merely on the authority of our human reason, howsoever refined and elevated.

But when Divine Revelation speaks; when, with eyes opened to the spiritual world, and with mind fully illumined, Swedenborg the Revelator declares that there is a spiritual sun with its heat and light; a real spiritual and substantial world; that angels are truly in the human form; and this because he himself has seen and testifies; then the mind, previously struggling with longing aspirations, and vainly striving by its philosophy to penetrate to the sacred shrine of theology, comes into new light, perception, delight. And then, looking back, as it were, it sees and knows that the former philosophy, which, when alone, had been in vain for its real spiritual enlightenment, is harmonious with the truth, confirmatory of it; and that, prepared by this philosophy, it has the true basis for the deeper entry into the sacred mysteries now revealed.

Such, as it seems to us, is the relation between the earlier works and the later. The two are harmonious. The voice of the one is the voice of a man who seeks to draw near to God, and whom God leads, that he may draw near; the voice of the other is the immediate speech of God, revealing to man His glory. The one is a palace that has been erected by human hands, but under the guidance of God, though oft unseen; the other is the Glory that fills the palace, adorns it within, and makes it the living habitation of our Lord.

THE TWO TO ONE RATIO OF ALKALINE TO ACID PARTICLE.

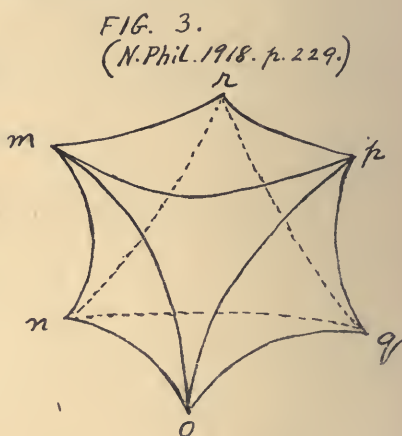
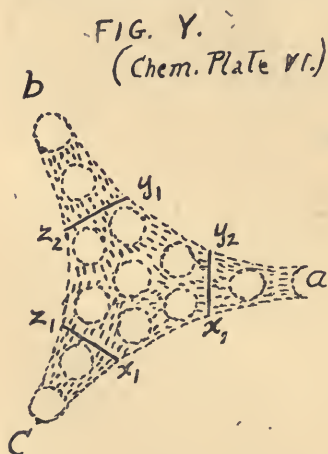
BY E. E. IUNGERICH.

In the NEW PHILOSOPHY, July, 1918, Prof. Brown published diagrams of the cubic interstice between six equal spheres and the tetrahedral interstice between four equal spheres. The essential features of the latter I reproduce as FIG. 3, in the present issue. He then showed that the volumetric ratio between these two interstices was nearly 5:1. The reader was, however, tacitly left to infer that the alkaline particle which Swedenborg declares was generated in the cubic interstice is identical in volume with it, and that the acid particle is identical with the tetrahedral interstice in which it was generated. Having tacitly assumed this identity in both cases, Prof. Brown naturally concluded that the ratio between alkaline and acid particle must be 5:1 and that Swedenborg was flagrantly in error to assert it is 2:1.

In my criticism of his paper, Oct., 1918, I called attention to the fact that since eight acid particles were genetically affixed to one alkaline particle there had to be a ball and socket relationship between these different kinds of particles. I cited Swedenborg's succinct definition of the acid particle, viz., "*A particle of acid has four hollow sides and four extremities or pointed portions.*" (*Chem.*, p. 67.) I then pointed out that Prof. Brown's diagram of the tetrahedral interstice signally failed to satisfy this definition; for though it had four hollow sides (*see* PQQ, MNO, MRP, RQN, in FIG. 3), the opposite (*cf.* *Chem.*, FIG. 1, Plate VII) extremities, as MPO for instance, were flat buffers and in no sense like the required "pointed portions."

The gist of Prof. Brown's reply is the admission of the ball and socket relationship, but accompanied by citations and a calculation intended to show that correction for this property would be so slight as not to affect the 5:1 ratio for which he contends. The citations he adduces are concerned merely with

the presence or absence of a single fifth crustal at the point of contact between alkali and acid, and he declares that this fifth crustal may just as frequently adhere to the alkali as to the acid. Prof. Brown, apparently oblivious to the teaching about the "four pointed portions," concludes that there is no warrant for assuming Swedenborg meant there were bayonnette-like spicules on the four blunt buffers, such as MPO in FIG. 3. All he will allow is that there may be, if I may so express it, the slight wart-like protuberance of a single fifth crustal in some of these at their centre; but that they are quite as likely to have an equivalent depression or cavity at the same place. His calculation shows him that a single fifth crustal would be 1-400th of the volume of the entire salt particle.



It seems to me that such an argument misses Swedenborg's real thought and tends to impale him on merely literal statements deprived of the needed light to understand them. The result is that Swedenborg's coherent system is made to appear confused, contradictory, and even grotesque. It is as if a man had diagrams of the front and rear ends of a dachshund and should insist we had no warrant to assume there was any intervening sections, but were justified by the facts to conclude that the rear end began where the front end

terminated. Prof. Brown similarly will not allow that there is any intervening body between the diminutive fifth crustal and a flat face like MPO. How, may I ask, could such a flat buffer with its diminutive protuberances, be fitly characterized as "a pointed portion?" And if, as he shows, the protuberance may just as frequently be replaced by an equivalent depression, will the resulting dented face in any way deserve such an appellation? By what mechanical miracle could so small a protuberance or cavity be expected to form a tight joint with the counterpart cavity or protuberance in the alkaline particle?

To drive these points home pictorially I have placed side by side with Prof. Brown's diagram of the tetrahedral interstices, Swedenborg's own sketch of the cross section of the acid particle. As a diagram it is open to the objections of exhibiting as if in a single plane three of the extremities or pointed portions, that are manifestly in different planes; but it at any rate gives us Swedenborg's thought on the subject. Examining FIG. Y carefully we note that opposite to a concave or hollow side, such as CX_1X_2A , there is a tapering spicule, BY_1Z_2 terminating in a fifth crustal. Occasionally, as at A, however, the fifth crustal at the apex may be absent, leaving a cavity in its place. According to Swedenborg's theory of solution by a moderately diluted acid, a water globule pressing on one of the hollow sides would drive the opposite pointed portion into the substance to be dissolved.

Now contrast the thought expressed in FIG. Y with the inadequacy of a shape like that in FIG. 3 in this theory of solution. There, a water globule pressing, let us say on the hollow side NRQ would urge the flat buffer MPO against the substance. This flat buffer whether ornamented with a diminutive protuberance or cavity, is certainly lacking in any penetrative power. Practically, in presenting FIG. 3 as virtually his idea of the acid particle; Prof. Brown has, in fact, truncated what Swedenborg had in mind by FIG. Y. He has removed such pyramids as BY_1Z_2 or AX_2Y_2 and left us only a truncated figure such as that sketchily represented by the hexagon $X_1X_2Y_2Y_1Z_2Z_1$. As in the illustration about the dachs-

hund, he feels the facts allow us to conclude that such apices as B or A must be affixed directly to Y_1Z_2 or X_2Y_2 , and that we have no warrant to conclude there is any intervening structure.

I am firmly convinced that the recognition of the existence of such pyramidal spicules as BY_1Z_2 or AX_2Y_2 to be what is meant by Swedenborg's "pointed portions," will solve the quandary between Prof. Brown's 5:1 ratio for his academic figures and Swedenborg's 2:1 ratio for the actual entities molded in their voids. As I set forth in my former paper, we only need to deduct from a cube of 80 units, eight cavities totalling 24 units; and to restore to the tetrahedron, four spicules totalling 12 units. Then we transform a ratio of 80:16 or of 5:1 into a ratio of 56 to 28 or of 2:1. The presence or absence of the diminutive fifth crustal at the apex will not appreciably affect the calculation, as Prof. Brown has ably shown.

I am convinced that in this way Swedenborg's 2:1 ratio is amply justified and defended. His reiterated insistence on this ratio should make us hesitate to impugn it, even if it does not fire all students of his philosophy to bend their efforts to see if they cannot sustain him in it.

"Two triangles," he says, "occupy half the space, and the cube takes up the other half." (*Chem.*, p. 31.)

"A metallic triangle or acid weighs to a particle of water as 13 to 9. . . . A metallic cube weighs to a particle of water as 26 to 9. This is a consequence of the preceding, as the weight of the cube is double that of the triangle." (*Chem.*, p. 137.)

With this 26:9 metallic proportion resting on the aforesaid 2:1 ratio Swedenborg subsequently proceeds to calculate, as a proof of his theory, the relative weight of lead to water. He triumphantly shows, (p. 143), that it is $11\frac{1}{2}$:1, which fully tallies with the practical experimental determination of the specific gravity of lead.

I recognize that this defense of the 2:1 ratio does not clear up all the difficulties and problems shrouding Swedenborg's chemical theory; but I feel that if one so severely impugned can be so easily solved, that we need not despair about the

possibility of getting light for the others. When we consider Swedenborg's asservation that he was led into the sciences by the Lord, imbued with a love of truth for its own sake, and kept from falling backwards; we should be heartened to give our lives to see what he meant and to exculpate him from the charge of clumsy and grotesque errors.

I fully endorse Prof. Brown's appeal for a concentrated effort of many minds to bear upon the chemical problems involved in his papers and our brief tilt. If some New Church expert with a lathe would turn out a few dozen models of Swedenborg's water globules and his alkaline and acid particles, not omitting the corresponding cavities and spicules in the latter two, the road to the solution of further difficulties still before us would be considerably smoother.

ON THE SOUL. (*Continued.*)

BY EMANUEL SWEDENBORG.

13. But dismissing these considerations, let us examine this system more exactly and with the test of scale or balance; and let us open this fruit and consider carefully the number and nature of the occult qualities therein contained.

The first point presented in the recital premised above is:

I. *That in the soul there is a unique force, namely, a force representative of the universe.* What this unique, proper, essential and natural force* is, to which is given the name "force representative of the universe," and what its nature, is, in my opinion, a question that presents difficulty in the unfolding and stands in need of the explanation of interpreters. Here, as in some dark oracular saying, the mind hesitates as to what is the meaning of a representation of the universe by an efficient force; nor do I possess such power of prescience and anticipation,—perhaps the author's meaning lacked adequate words wherewith to express or fully bring out what was pictured in his mind,—as to know what the author wished to express by the statement that the soul has the power of producing an idea of the whole present universe without direction by any extraneous and higher principle.† If I grasp his meaning, I would state it as being that the soul is the efficient sufficient cause of the whole of perception; or, that it is a living tablet or mirror wherein is a force that represents the objects of the universe; or, that there is a force in the animal mirror the effect whereof is, that everything is represented universally; or merely, that there is a force. Pardon me for wishing to get at the matter and make it clearer to myself by a guess. But assuming any one of these meanings, though I do not then concede the position, what comes clearly to the perception, as a proposition thoroughly ascertained, is, that in the soul there is a force of acting and perceiving. All the other points are matters of occult quality.

*Wolff, *Psychol. Rat.* 613.

†*Ibid.* 613, 614.

14. *That this force produces all perceptions [and appetitions]; and these have their sufficient reason in a force representative of the universe.* When one is at a loss as to what a force representative of the universe is, and what its nature, all the operations resulting from it are also of an ambiguous and obscure sort; and especially when, among philosophers, there is no clear notion as to its nature, nor any agreement as to whether it is representative of the universe and unique, or whether such force produces perceptions. In the latter case it would owe these perceptions to itself alone, although not originally, yet now principally; and it would follow that perceptions are congenital or co-existent with such force, inasmuch as there is only one force, and it excludes any dependence on the body, and nevertheless is sensible, being perceptive and self-conscious. I have no desire to descend into details, for it has not entered into my mind to be entirely opposed, but merely to make it plain, that with this system every quality is terminated in things occult. For as to knowing what it means that the same force produces, the same represents to itself, and the same sensates and perceives the thing represented; or, that the same force both produces the effect and comprehends it, and yet is most absolutely unique, and the soul a pure substance,—as to this, I confess I am a Davus not an Œdipus.* Were belief a matter under my own control I would willingly add my faith; but not being so highly acute and keen sighted, to me it is all an occult quality.

15. *That in the soul there is a series of perceptions and appetitions and thus of volitions; but in the body a series of motions; which two series, by virtue of the nature of the soul and body, are harmonically consentient.* This comes under intelligent apprehension and is a point on which all men are fully persuaded; namely, that in the soul there is a series of perceptions and appetitions like the series of motions in the body, and that these two series are harmonically concordant

*Davus is the name given to several simple characters in the comedies of Terence and Plautus.

Œdipus was the king of Thebes who solved the riddle of the Sphinx.

and coincident For it is clear as day, and as though written in the sun's disc, that we perceive, that we appetite, that so we make the corresponding motions, and that all these operations flow harmoniously. But, like a quality still more deeply occult, the question, What, and of what quality, is the nature of the soul and the body, is left undertermined.

16. II. *That this force is proper to the soul, being independent of every extrinsic principle, and of the body itself. Thus, by this force, the soul produces all perceptions and appetitions in a continuous series.* I am still kept in perplexity as to whether I should or should not believe that, according to the system, all these series coexist in the soul, and that the soul lives in its own self-similar principle from the first moment of its existence to that final end when it is released from the body and will live in a state left to itself and freer; and thus that only by imputation does it pay the penalties of the motions and actions of its body,—a necessary consequence if it be independent of every extrinsic principle and of the body itself. In such case it must contain in itself the whole of the body's nature, as that nature was when the body existed; consequently, it would be an entity disconnected from causes, and would nevertheless be natural and in the world. How, in this way, it could subsist, and could perceive the thoughts of others, mediately or immediately; or could perceive the delights of the world or of heaven,—by the mediation of heaven the delights of souls in consort. or, by the mediation of the world the delights springing from like souls in society; how it could apply to itself the grace of its Deity, and this with a sensation of a love involving connection and dependence; and so likewise, how moral actions could exist, since there can be nothing moral in them, except that the perceptions and appetitions of the soul are harmonious and concordant with the modes and motions of the body; or, if souls cannot be affected or defiled by their body, whether therefore all souls are of a similar quality,—all these points I certainly do not know; and were I credulously to adhere to a belief in mere dicta, I would still be in the same ignorance. This absolute

independence inverts all rational philosophy, and either it must be rejected as among occult qualities, or the whole moral world and all moral actions whatsoever, and also the dependence of effects on their causes, must be pronounced occult qualities, both in the general and in every particular. If in place of proof conclusions such as these were to stand as irreproachable, or, as the saying is, as inscribed on Jupiter's tables, vain and fruitless would it be for men to devote themselves to penetrating into qualities. Better then would it be that all who have hitherto given sleepless study to the discovery of causes, or have exhorted their posterity to a like toil, besmear their papers with blotches of ink.

17. III. *That the soul would represent to itself perceptions and appetitions, in the same way, were there no body, or no visible world.* In other words, that its state would be unique and always identical and absolutely the same, both in the body and the world, and outside the body and the world, inasmuch as it would represent to itself its perceptions and appetitions in the same way in the one case as in the other. I am afraid that it also involves that the soul is neither in the body nor out of the body; neither in the world nor out of the world; or, that it is universal, and in no respect dedicated or joined to its body; or, that whether it be present therein or absent, it amounts to the same thing; or, that new souls are being supernaturally created every day; or, that they were all created from eternity; and that they subsist in the same supernatural mode whereby they came into existence; and consequently, that a like predication would apply to a body formed according to the same harmony. Meanwhile, since, in such absolute independence I can comprehend neither a connection nor a cause, so neither can I comprehend any effect. Hence I am induced and compelled to reject it as a substance of some other world, and as being, like all the rest, among occult qualities.

18. IV. *That this force is bound to observe certain laws. Consequently, that there are laws of perceptions and also of appetitions; and that the law of sensations contains the essential determinations of the soul.* From the indications of argu-

ments, which are as many in number as are the motions of the body, it is an evident and clearly ascertained truth, that in the soul there are laws of perceptions and also of appetitions. And since the soul is conscious of itself and of the actions of its body, we have no need of any particular providence in order to comprehend these operations. But there remains the difficulty, Of what nature are these laws, that they should be consentient with those in the body? We are also aware of the fact that the soul's force or actuality is bound by laws and rules, within which, and to which, it is limited; and so I do not very well see what its representation of the universe can be. But when nothing more is discovered to us than that there is in the soul force, perception and appetite; and likewise sensation, essence and determination; and that each of these has its own laws; our wisdom reaches no further than experience. Moreover, for knowing these things there is no need of consulting any system as our oracle. To proceed: The rationality of the soul does not consist in the consciousness and perceptions of the actions of the body and of ourselves, but in the ability of the mind to connect them, and thence to draw conclusions, and wisely deduce the quantities and qualities latent in their causes. For we know that there is no appetite without a cause, nor any cause without connection with a prior cause; and consequently that there is a connection of causes antecedent to our appetising that which we perceive. Rationality, therefore, consists not only in our being conscious that we perceive and appetite, but in our being able to investigate the connection of causes, and thence to conclude what ought to be appetised and be transmitted into the will, by the medium whereof it goes into action and effect. Thus the effect of rationality is first lost, when, by frequent use and custom, we contract a habit, so that, without any examination of causes, we are in appetite as soon as in perception, in will as soon as in appetite, and in the effect as soon as in volition; and so forth.

19. *That there is a law of imagination which has some reason in the law of sensation; and likewise the reverse. Im-*

agination, therefore, by its laws, would depend on sensation; and yet the condition of sensation, which involves some communication, could not have obtained in a state when each was independent, inasmuch as ideas and images are, to use the common expression, the immediate materials of the organs, and the organs belong to the body; or, inasmuch as the aforementioned ideas are harmonious with perceptions, just as the motions of the body are harmonious with appetitions.

20. V. *That God has pre-established a harmony between the soul and body, in that He has joined to the soul a body wherein can exist a series of motions consentient with the perceptions and appetitions of the soul.* It is quite clear to all that there is a harmony of soul and body, and that the actions of the one follow, as by connection, from the perception and will of the other. But a mind desirous of investigating the connection or commerce has no wish to stop in generalities, or to be under the dictatorship of the senses. She demands a system that shall indicate, or establish the possibility of it being indicated, what the harmony is and what its nature, and also what the commerce is and what its nature. There is no dispute as to the existence of the harmony and commerce, but what the mind longs to receive is the answer of the wise respecting their nature. No one disputes the fact that the eye sees, but the enquiry is as to how it sees, and what is the nature of its forces, laws and modifications, and of the concentration of the rays in their passage to the retina through tunics, humors, uveas and irises. Everyone is aware that the ear hears; but what needs explanation is how it hears, and by what instruments and means it takes in the modulation of the air or sound. That there is a harmony of the modulations in sounds, is a fact universally known and widely proclaimed, but as to the nature of the harmonic laws and ratios and their causes, this must be followed up by experience and the intellect. So, in the system, what is desired is, that it shall unravel this question as to the nature of the harmony, or shall interpret it as a matter hitherto obscure. But the answer of our wise man is that there is a harmony, and that God has pre-

established this harmony between the soul and body! In this way does he dam the stream and stop up the fount, and at once extinguish and put to death all desire and hope of knowledge; and he utters the pronouncement that harmony is pre-established, or, what amounts to the same thing, that pre-establishment is an occult quality. If Themis* had given out from her oracle a response concerning the first entities of the world, that they were atoms; and that in these atoms were an essence and forces the laws whereof were occult; and that nevertheless there was a pre-established harmony between the atoms and the compound substances of the world; would not a ripper age, busied with the work of penetrating into the qualities of things, hand over the whole story as material for their players to make up some fable about these atoms that would be suitable for comedy and the stage? And would they not give it to Media for renovation, as was done with the useless and wornout body of Æson?† The cultivators of this system terminate all their knowledge of their microcosm in their own peculiar harmony; and they build a hedge in front of wisdom lest any man turn his mind to the soul's qualities,—which, like the harmony itself, must needs also be pre-established and occult. And if perchance there be one who is unwilling to stand at the threshold as a perpetual door-keeper, but will knock at the doors or dare to enter the building, there will be no lack of command that he keep away from the sacred portals and betake himself afar off as one profane.

21. But since the fact that there is a harmony, and that it actually exists, is among things already known and published, the system goes on to say that God joined to the soul a body, wherein might thus exist motions consentient with the perceptions and appetitions of the soul. This cannot be far from

*Themis, the daughter of Heaven and Earth, was the goddess who presided over the order of things as established by law and

equity. She succeeded Earth as the oracle at Delphi.

†This story is told by Ovid in his *Metamorphoses*, Book I, Fable 2.

the truth, since the fact that the body acts and effects that which the soul desires and appetises, cannot escape anyone who is conscious of his own being; and also the fact that actions and effects are harmonically concordant and consonant with their means and causes. But the independence spoken of above draws the mind into perplexity as to whether we ought to assume a harmony of this kind, which in two subjects and substances, shall be concordant at every moment and in every way, and this without any connection and dependence except only "as respects the specification of perceptions and the continuity of the time in which they are contingent with the motions in the sensory organs."‡ And since there are in the soul most constant laws, and a unique force that produces and represents all things; and likewise a harmony that is constant because pre-established by the supreme Deity, I do not know how they could meet together in some third term; or how the mind could so unanimously conspire with its body in things inharmonious and dissonant and entirely alienated from the whole moral world, as to perceive disharmonies as consonant with itself, appetite them, pursue them, and follow them into the very act. And unless the Almighty had adjoined to the mind a body of like nature as the harmony or the soul, how could the one co-operate with the other? Would there not thus arise a disharmonic discord, or a discordant concord?—the soul remaining continually in its own state, obsequious only to its own laws and not to the laws of another. Unless indeed there be assumed in the soul none but a completely passive power wherein could be represented all things in the universe; and not an active force which, from itself, would produce and represent sensual ideas, perceptions or appetitions, of which we would be made conscious by means of motions in the body, or of modes and mutations in the sensory organs. Therefore, these positions also are hurled into the same lake of ignorance and oblivion, or of occult quality, with the harmony itself.

22. VI. *That God has not pre-established appetitions in the*

‡Wolff, *Psychol. Rat.* 620.

soul, but only a harmony between the motions excited in the body by means of impressions made on the sensory organs, and the perceptions of the soul; or between voluntary motions in the body and the appetitions of the soul; but still apart from any real dependence upon the body. I do not call for an examination as to whether this is in agreement with the aforementioned and pre-established propositions; nor is this the place for such examination. I wish merely to consider the number of occult qualities here met with, that is, the number of qualities which, according to the suppositions and impositions of this system, must forever remain unknown. Meanwhile the conclusion is made, that in the soul there are perceptions, but that appetitions have not been pre-established therein; or, that in the soul there is something that is not pre-established, and this, despite the fact that the producing force is unique; and that this something nevertheless belongs to the mind or is in the soul. I know not whence appetite can come unless there be previous perception; nor whence will, unless appetite precede; nor whence all these, unless there be a previous force. If, then, there be a harmony between modes in the sensory organs and the resultant motions in the body and appetitions in the soul, it follows that the soul appetises or wills nothing by herself, but only by help of the organs, and that left to herself, she has no decision or will; or, that she appetises and wills all things universally, and that left to herself, she has decision and will as applied to all things or as applied to nothing in particular. At this rate I do not comprehend what it is in us that appetises and wills what is morally good; and what it is that dissents with the body and fights it; in a word, what it is that desires heaven; that desires a gracious deity; that feels love; what it is that seeks after wisdom and longs for it; what, that quickens perception; what, that gives delight in perceptions, and so forth. To me all these expressions are ambiguous utterances, so long as I am in ignorance as to whether appetitions, unlike harmony, are not pre-established, but arise by means of impressions made on the sensory organs; and so long as the

thought remains that a harmony is pre-established by God between all the motions of the body, and the like appetitions, of whatever quality they be, in the soul; and so long, moreover, as I am in doubt as to whether it is possible to have harmonies in two subjects which shall be actually consentient at every moment and in every mode, apart from any dependence upon each other. The settling and explaining of these occult qualities needs the services of an augur.

23. VII. *That material ideas, to which answer sensual ideas, depend on the impressions made by sensible objects upon the sensory organs; and that vountary motions which answer to the appetitions of the soul, depend on the motions of the nervous fluid flowing into the motor fibres.* These points are included among the matters of moment that are to form the special subjects of my Transactions. I, therefore, pass on to the following:

24. VIII. *That by virtue of the mechanism of the body, material ideas of sensible objects give rise to motions answering to the volitions and appetitions of the soul; and this apart from any immediate extrinsic determination.* On these points also I shall treat when I come to the mechanism of the body and of its motions.

25. IX. *Consequently, that from the series of motions in the body, a reason can be rendered why perceptions and appetitions arise in the soul, and why they are of a given nature rather than of some other; and the reverse. And that the presence of material ideas in the brain contributes nothing whatever to their production.* I might surrender to the belief that from a series of motions in the body a reason may be rendered why perceptions of one kind or another arise in the soul, were it not that I am also asked to believe that the presence of the ideas of the sensory organs contributes nothing whatever to the production of these perceptions; for what the one position binds the other seems to loose. Where that reason can be, that is to be rendered for the origin of perceptions and appetitions in the soul, I know not, inasmuch as the presence of the aforesaid ideas contributes nothing what-

ever to their production. The added clause seems to involve a contradiction, especially when there is independence, and neither acts upon the other by any connection, whether of contiguity or of continuity; and yet, according to the statements premised above [n. 19] the law of imagination must have some reason in the law of sensation. Suppose the reason to be that there are similar laws and series of perceptions and appetitions in the soul, as of motions in the organs and the body. What then is the reason that the one acts almost simultaneously and in an instant with the other?—unless there be a connection and real dependence, and a resultant consensus. And what is the reason why we appetite to-day what yesterday we were averse to?—unless there be a connection, and unless the one really dispose the other to action conformable to its nod and arbitrament. What is the reason why the will comes first, and enjoins motions on the body? and likewise, that the soul obeys the motions of her body, even when she herself perceives the contrary?—unless there be a real dependence and connection. And again, what is the reason why perceptions and appetitions, and the motions corresponding thereto, are never wholly identical and alike in one animal subject as in another?—unless there be a connection and a mutual action of soul and body. What is the reason why, from frequent repetition of actions and from custom, the soul contracts a habit and instinct as it were, of perceiving, appetising and willing, so that, all unawares as it were, she spontaneously recurs into like motions?—unless there be a connection, and unless the one affect the other. Where else than in a connection, must be sought the reason why there is so marvellous a correspondence between the two in respect to causes and effects? What can be the harmony between them, if the one lives independently of the other? Whence comes their concordance and consensus? Acute indeed must he be, and capable of discerning affections in a vacuum or nothing, who can discern the presence of causes and effects, and at the same time their independence. For myself, I confess I am prevented from even conceiving of an imagination so acute.

26. X. *Furthermore, that all these operations can be understood without supposing any action of the soul upon the body; and that they are all effected naturally; and the commerce between soul and body is explained in an intelligible manner by the very nature of the soul and of the body.* With what words these operations can be explained, and by what reason they can be understood, provided we suppose no action and reaction of the soul upon the body, is, to me at least, a mystery. If the matter is to become intelligible by the very nature of the soul and body, then these natures must first be defined. And if the definition be given that, in the soul it is a motive force, unique, proper, and representative of the universe, this nature with its force is still one among those occult qualities which we recounted above; and likewise I do not thus well see what can possibly be the nature of a single force having a single limit and end and no part, and this in a thing most simple and which is separated from the world. If the nature of the motions of the body be the sum, aggregate or product of numerous motor forces; or, if it consist in a series of modes; or in modifications; then, granting the system, I do not understand how the commerce between soul and body can fall within intelligent apprehension. For the mere word "nature," or "forces," or "modifications" supposes nothing to the intellect. But these points will have to be unearthed by the ingenuity of other men; to me the whole thing is an occult quality.

27. *That nevertheless, the necessity of the motions that correspond to the appetitions of the soul in the body, does not detract from liberty being in the soul.* As to this also, it being a matter that requires deeper investigation, I have decided to give it special treatment in a separate Transaction.

28. XI. *Lastly, that the mechanism of the body is incomprehensible, but yet is not devoid of probability.* Here is the culmination of the system,—that these motions with their forces, determinations, laws and series, are all incomprehensible but conjecturable! As a consequence, all the properties predicated of them are occult qualities; for the mere fact that

they are called natural is not enough. What service then has this so famous system performed? and what does it involve other than that all the laws of our kingdom are unknown to us, and that we can learn only that they are? and also that the book of natural statutes and laws is kept well guarded and ever closed? And so long as the system acts as guard and sentinel, it can never be unlocked or its pages opened; and all who shall dare to break the lock of this volume or sunder its chain, must suffer the pains of Tantalus.

29. Unless conjecture deceives me, we are warranted in supposing that the principles of the aforementioned system have been drawn from the calculus of fluxions or infinities, called the differential and integral calculus, where the differences equal nothing as it were, while the integrals, both constant and variable, denote motion, times, dimensions, lines, areas or bodies. And since there is no comparison between the indefinitely small and the whole, inasmuch as the one is like nothing while the other is a quantity or quality, hence there is assumed in the soul a harmony and a ratio of laws, similar to that in the body; not unlike as in the above mentioned analysis, where the ratio between the differences is assumed as being the same as between the integrals; and, although there is no dependence of the one upon the other,—there being no possible ratio between a differential and an integral,—yet the two can be joined together by analogies and harmonies, and the one can be combined in calculation with the other. Thus they can enter into the same equation and analysis, and so from the one can be elicited what is in the other, or what is the value of the other. But an argument drawn from the calculus and pure analysis is not valid as applied to real entities.

30. But lest I seem desirous only of derogating from the credit and authority of principles that have been brought forth, like clever offspring, from brains and judgments trained and cultivated, and whose opinions and sayings are taken up and adored as so many oracles, it is incumbent on me to declare truer principles. For it is not proper that one who acts as an examining judge, shall determine a question unless he

be well learned and skilled in the law, and be in a position to plead a cause of which he has knowledge. In our smaller works, therefore, and in our Transactions, it shall be our labor to demonstrate the nature of the harmony existing in the animal microcosm, together with its forces, laws, series and motions. Then, you also, my readers, shall sit in judgment as to what service I may thus have performed.

31. Now since I have indicted the aforementioned system,—wherein so many qualities, and indeed almost all, are assumed as pre-established and incomprehensible,—and have charged it with the crime of leading direct to ignorance of things, it is necessary that we bring before the court for examination according to the principles of the system, some general action or effect of the body and soul, that thus it may become evident and be made more clearly manifest whether, by proceeding according to the rules systematically laid down, we are led to a knowledge of its causes, or are led from light and knowledge to darkness and ignorance. The truth will shine forth from the examples.

32. There is no affection more familiar and widely felt in the animal kingdom than the desire of venery, or that love which, when legitimate, is called connubial. The question then is, From what natural principle and cause does this love take its origin and derivation? If we are to remain continually in principles, the systematic answer will perhaps be that it arises from a force of appetite in the soul to which corresponds a similar motion in the body, in agreement with laws that are natural and with a harmony that has been pre-established between soul and body; or, what amounts to the same thing, that it arises from an occult force of appetite, to which corresponds a similar but incomprehensible motion in the body, in agreement with occult laws and with a harmony that to us is also occult. Consequently, it is an instinct, the effect of which we experience, but the subordination of whose causes from their first to their last we are ignorant of. A further question is, From what causes does it actually exist, and by what means is it derived into the body whereby it passes into

the effect? The answer will perhaps be, that it is by means of material ideas, to which answer sensual ideas, and which depend on the impressions made by sensible objects upon the sensory organs; and that in this way there arise motions answering to the appetitions of the soul, and [which depend] on the motions of the nervous fluid flowing into the motor nerves,—but apart from any real dependence of the appetitions of the soul on the motions in the body, except that they are harmonically inter-correspondent. Still another question is, Whence comes this instinct that it should pass over from perception to appetite, and so forth? It may be answered that by the soul's proper and occult force it comes to perception; from perception, by occult reasons, to appetitions; from this, by an occult law, to volition, of which latter there are occult series according to which the instinct is produced. Thus to this instinct, by means of an occult and pre-established harmony, there correspond an occult series of motions in the body, arising from occult and incomprehensible forces of the body, according to an occult nature of both soul and body. Thus, whithersoever we advance our step we are brought to a stop in words and characteristic symbols which, being of an occult quality, have no sense and to a wise man, mean nothing at all. For what is force, law, series, harmony, motion, without a knowledge of its quality? What, but a sounding word the meaning whereof, in other connections, we must unearth from qualities of a like denomination! But whether they apply in the present case, and how, cannot well appear to the mind, so long as the forces, motions, laws and series in the body are incomprehensible,—and still more incomprehensible must be those in the soul which harmonically correspond, and which exist in an impenetrable force representative of the universe; nor can it well appear, so long as this force is the force of a soul independent of every extrinsic medium, and on which, as being a pure substance and produced from nothing, these qualities are impressed supernaturally.

33. Since in every answer, immediate refuge is thus taken to asylums of ignorance, we are prevented from learning as to what importance, or what merit and trust, is to be attached to

these principles; or from knowing other than that a thousand similar principles might be set up, provided only the soul be given scope to delight and indulge herself in her own ideas, and permission to make up fictions. Only add faith and authority to things unknown, and which must remain unknown, and they will be received as so many prophecies, oracular utterances and Sibylline leaves. Since one neither can nor dare dispute them, they often have greater weight than the clear proofs of evidence. In this way they seduce and captivate a mind that is not furnished with any power of arguing by a series and connection of causes, or with any great amount of rational philosophy. And then fruitless and vain would be the hope of ever seeing in public light a rational philosophy, or of ever searching out and bringing to view the causes latent in nature's more occult sphere, by means of the numerous facts and the exquisite experiments, made with so great study, with which the world now abounds.

34. What would the ancients think if they could rise from their ashes, or lift up their heads from their urns and tombs, and again visit the learned world, were they to hear that they had lost their cause, and that, agreeably with the view of more modern schools the pronouncement had gone forth that there is a pre-established harmony, a substance consisting of nothing, and a force implanted and independent, and yet co-operant! that in things non-extended there exist qualities truly similar to geometrical qualities, and that infinities can be fictioned in things non-immaterial! and that there is a vacuous universe wherein bodies float about geometrically and mechanically in accordance with their own inscribed laws! or that there are as many occult things as there are things invisible! Would they not take issue with our schools, and impeach us by natural and rational law, on the ground that we have banished their monads, and in their place have substituted many things equally occult?

35. If they could pass over to our time or age, or if the span of their life could be transferred to our day, they would indeed wonder that the present age should be so eminent in

experiments and so enlightened by the facts of experience as to proclaim that nature's every measure and mode is now unearthed, or that the whole of nature with her hidden secrets and arcane mysteries is now laid open to the learned world; and that nevertheless, excepting her face and clothing, nothing of nature as yet stands forth in open day; that she still lies hidden in her causes, and indeed more deeply concealed than when, in a less experienced age, she covered her whole countenance!

36. Meanwhile it must be admitted that our contemporaries have left no way untrod, nor any throw of the dice untried, in order by experiment and actual proof, to elicit the forces and causes of active nature from her world and its phenomena; and that in matters of experiment the learned world is so effective that in these respects they have earned the palm of victory above the ancients.

The ancients hardly touched the first threshold of the heavens, while modern astronomers, looking from our earth, have examined and thoroughly surveyed their hidden depths. With a sight made keen by glasses, they have penetrated to the moon and wandering stars, and to their shades, their valleys and their mountains. They have looked into the satellites and circling bodies of the planets. They have numbered the spots on the sun. With their intellect they have followed up and discovered the axillary or diurnal rotation of our earth, and also its annual course and gyre; and they have found that the sun is stationary, even though this is denied by sight and apparent experience; and the vulgar still swear to the motion and rotation of the sun, and the simultaneous daily motion of all the stars,—as though they swore according to the faith and dicta of their senses only. To us at this day, as the poet sings:

"The doors are opened,
And the golden halls within come clear to view,"*

that is, the halls of Olympus, wherein, if we may be allowed

*Ovid, *Meta.* iv, 762.

to make the comparison, the ancients wandered like strangers and guests.

How mighty are the labors that have been devoted to the searching out and evolving of these discoveries by such astronomers as COPERNICUS, KEPLER, GALILILEO, TYCHO BRAHE, LA HIRE, FLAMSTED, HEVELIUS and others! men deserving to be lifted up to their own sky with manifold honors and resounding praises! in whom the praises bestowed upon the ancients become dim and are overshadowed! Had these men lived before their times the ancients would surely have offered sacrifices to their shades, and instituted those honors which they have earned from us their immediate offspring.

37. To what height have not the labors of the geniuses of our age raised geometry with its measures, and analysis with its ratios! It stands on a pinnacle and summit so high that it is scarcely possible to go higher; and from there, as from a lofty elevation, it beholds with extended gaze the countries and spacious fields that lie beneath; and especially those three broad and magnificent kingdoms of nature, the mineral, the vegetable, and most of all the animal, which it longs to visit that it may there exercise its art and science. There is nothing it more greatly values and desires than the privilege of being present in the councils and secrets of the empress and queen of these kingdoms,—even nature herself ever bound by her rules and modes. For their science is cleverly and ingeniously skilled in the art of reckoning ratios, numbers and symbols, and of calling into its calculation even forces and laws which it sets forth in ordered and practical form and quickly solves; so that, to use the words of the poet,

“By devious ways it knows to split the farthing to a hundred parts.”†

If the illustrious ARCHIMEDES, so greatly esteemed by his fellows, and easily their prince; if EUCLID, the most eminent man of his own and following ages, in natural endowments and the keenness of his judgment, who shed light on things

†Horace, *Ars Poetica*, 326.

by a genius of his own and not of others, and who was the parent of so noble an offspring,—if these men were living now, how intensely would they have loved our age, and taken delight in the geometers of our day; especially in LEIBNITZ crowned with laurel by his compatriots; in NEWTON, the most eminent among his countrymen, who has deserved the honored badge of achievement whereby his authority is acknowledged; and also in the two BERNOULLI, and many other mathematicians who either have founded the analysis of infinites or fluid points, or have learned and cleverly applied themselves to the Euclidean or Archimedean art; of which science the ancients have given us but the slightest foretaste and the earliest fruits. In geometry, therefore, the ancient and the modern world are both deserving of our praise. Both ages also have labored for ever to eternalize their writings

“By carved word, and story writ in history’s page.”*

38. It would take many pages to go over all the arts and sciences which have been lifted up by our age almost to the height of Mt. Pindus, whether those which it has refined after resuscitating them from the tombs of the ancients, or those which it has conceived and brought forth from its own Minerva and its own brain.

Worthy of mention are the advances in the art of optics, whereby we of a later age have learned so to arm our sight that we can penetrate into the occult forms and images of a world too pure for the sight of the eye; and, in detecting the smallest things of nature, can avail ourselves of a sharper light; in a word, can make objects more nearly present before us, and can shorten distances. We know how to make and polish lenses and glasses, called microscopes and telescopes. By these instruments the eye can turn its sight to the most minute animalcules, and in them can fix its gaze on objects which formerly were smaller than the least ray of its organ. By their aid objects now come under our eyes, which to the ancients were in thick darkness. We can now measure by

*Horace, *Odes*, IV, xiv, 4.

our sight, the bodies that wander around the sun; earths, like our own, which are spread about in its vortex, and also their companion moons, together with many other phenomena which to the ancients were all unseen. But the mere mention of these things would fill two or three pages. The fact that we of this day are more keen sighted and sharper visioned than the ancients, is due not only to the English, but also to the French, the Germans and the Italians, among whom have lived men famous for their inventions and arts, and who are too secure in their own achievements to have need of me as their herald.

39. Our contemporaries, moreover, have drawn rational philosophy away from its trivialities and the dust in which it seems to have lain for so many ages past, and have brought it to a more enlightened field of contest and a nobler arena. The one who seems to have taken the prize or palm of victory in this field is that eminent philosopher of our age CHRISTIAN WOLFF, who in these contests defended, not an empty title nor a fame acquired under the shield of some renowned athlete, or, as the saying is, under a lion's skin, but a fame won by his own martial courage.

40. It now remains for us to approach nature where she lies hidden in her invisible and purer world; and no longer merely to celebrate her sacred mysteries, but to invite her into our bridal chambers. For she is now well nigh unclothed and revealed in open day. Rational philosophy has already taught us the nature of her forces, causes, modes, reasons, laws, series, connections and so forth. Geometry with its analysis has taught us the nature of her numbers, measures, degrees, moments, figures and dimensions; optics the nature of her form, countenance, and clothing within the sphere of rays that are less than the organism of our sight; physics, chemistry and experimental psychology, the nature of her motions, actions and effects, both in the elementary world or atmospheres, and in the triple kingdoms of that world. No longer can she flee the keen vision of the learned of our age, nor conceal herself in her qualities, and thus escape us. She has now hardly

a covering wherewith to veil and girdle herself. Already she awaits from our age a man of genius, trained by experiments, disciplined by the sciences and study, and possessed of the faculty of searching out causes, of pursuing the argument by connections, and of making determinate conclusions according to the series; to whom, in our day, as I think, she will betroth herself; and I prophesy that she will then yield to the darts of love and join him in covenant and in bed. Would that I might scatter the nuts, and head the bearers of the torches!*

41. *The mind does not accept it as proved that the soul is a purely simple substance, unless it know what simple substance is.* The atoms of the ancients have been exiled and driven forth from the field of the learned world; for they have now become obsolete, obliterate by their mere age; and their memory is preserved only in our annals. In their place monads and simples have been adopted as the primitive entities of the world. These are now so widely proclaimed, that our pulpits and professorial chairs resound with nothing but simples; the spectators applaud the sound and show their favor by unanimous voice and approval; and were I to add my applause to theirs, I do not know whether I would thereby come nearer to their esteem so long as I remain ignorant as to what these simples are, and thus, like the rest, bestow applause on a mere sound.

42. *We are also confused at the variety of the monads and simples, which are made up to be equal in number to all the essences and substances that are purer than the organism of our senses.* As soon as we betake ourselves from an effect to its cause we immediately fly to simples as asylums of refuge, and from there give our answers, concentrating in simples

*The allusion is to the custom at Roman weddings. The bride was led to the home of the bridegroom in a night procession which was preceded by five torch bearers; though allusion is sometimes made to the bridegroom himself as a torch bearer (Ovid, *Meta.* x,

16; Plautus, *Curc.* I. 9). After the bride had been led to the bridal chamber, it was the custom of the bridegroom to scatter nuts to the boys in the crowd. See Virgil, *Æneid*, viii, 30; Catullus, lxi, 120 seq.

almost all the qualities that we have ever observed in the effect. Rational souls are held to be simple substances [Wolff, *Psychologia Rationalis*, 645]; and in order to assign to them attributes, essentials and qualities, they say that "these substances are endowed with intellect and free will" [*ibid.* 645]. The souls of brutes also are said to be simple substances [*ib.* 758], wherein is "an analogue of reason" [*ib.* 765]; but which are devoid of intellect and free will [*ib.* 761, 763]. So likewise spirits, however many they be, or whatever their quality, are all referred to the class of simple substances [*ib.* 658, 659]. The elements and primitive entities of the existing world are also pronounced simple substances [*ib.* 644], to which are adjoined their own proper attributes and essentials which are "ever the same, while modes successively vary" [*Ibid. Ontologia*, 770]; and consequently are "enduring and modifiable" [*ib.* 768], or "are the subjects of intrinsic determinations, constant and determinable" [*ib.* 769]. In a word, they vend about, and assume as many simple substances as there are series of things observed in the world, and they say that in these substances as principles, must be the analogue of similar series. To every such substance in general and in particular, they attribute conatuses, forces, determinations, laws, series; or, what amounts to the same thing, some ratio or analogue of these qualities; besides many other things, all of which have to be comprehended and represented to oneself purely and analytically by the bare faculty of intellect and imagination. They assert that all entities and substances of this kind were created and produced from the same origin, to wit, from nothing [*Ont.* 691]; and yet in these substances there are affections, and these are not affections of nothing, but are qualities agreeing with the essence of each substance. In these simple substances, they say, there are no parts [*ib.* 673]; consequently, no limits from part to part; but that they are all mere entities, and bare essences with their forces, conatuses and determinations; and yet they are limited and finited, since they are natural and are subjected and dedicated to their own laws and to none others. They further say that they are

therefore not divisible into points or parts [*ib* 676]; but if they were divided they would relapse into their nothing. Likewise that they are devoid of "degrees" or of "quantities of quality" [*ib*. 747], and also of moments; or that they are devoid of dimension, measure.* . . . [*ib*. 752.]

72. . . Nor are utter strangers to the truth; which is usually the reason why rational philosophy is so often the source of errors, and why its leaders wander further from the right path than those who place their ultimate causes in causates. For in causes that are far removed from effects reason frequently requires and demands of the soul faith in the effects that come therefrom, because in the causes,—as is the wont with systems of every kind. But this by the way.

73. To resume. In psychological† matters one must not at once and at the very threshold be anxious to enquire into the soul's substance and its proper forms and laws, that is. into the causes of effects; nor vaguely declare that, springing immediately out of nothing, it is more simple than any natural substance; and then, by a connected series, derive it into effects. To arrive thus suddenly at the truth of the consequence must be the work of a divine mind; for then

"The seeress dark, unmindful of her sayings vague"‡

will speak with prophetic mouth, as one who clearly discerns the future.

But let us dismiss these deeply sought principles, and confine our enquiry to the question whether the soul is within the world, that is, within the circuit of nature; as opposed to the

*Here sixteen leaves, or thirty-two pages, are missing from the MS. In order to indicate the absence of these pages we have assumed that they contained thirty paragraphs; this accords with the average number of paragraphs contained in the immediately preceding and following pages.

†According to the Latin edition, the reading is, *In physiologicis*,—in physiological matters. If this is the true reading of the MS. it would seem to be a slip for *in psychologicis*. Confer the preface to this little work where Swedenborg includes it as one of his "Psychological Transactions."

‡Ovid, *Meta.* vii, 760.

opinions of our contemporaries and indeed of the leaders of modern philosophy, who have banished her from the world, and who declare that she would be the same were there no world or no nature. As soon as it is proved that the soul is within the gyre of nature, or is an entity of the purest world, that is, of heaven, then, with the guidance of philosophy, we may be allowed to enter upon and follow up the question as to the nature of her motive causes, potencies, laws, series and substances; likewise, by what connection, relationship and necessity she conjoins herself with the organs of her lower seat, that is, with the series of her body,—series which she seems to have received into the closest affinity and proximity with herself. That in her microcosm, it is the soul that holds the helm of empire and the place of eminence, she herself declares; and likewise that she provides for the fortunes and welfare of her body, and commands every least point in its operations, which flow from the will or instinct as though without previous decision.

74. Now that the soul is in the world, and within the gyre of nature, is evident from the fact that she is in her microcosm; for they who class her as among the entities of no world, place her no where; they seem to desire to expell her not only from the world but also from her own kingdom. That she is enclosed within the walls or limits of her kingdom, that is, in her body, becomes clear from the fact that, from the first moment of the nascent embryo she begins to preside over its diminutive body, and puts under her own authority all the parts and connections both in the womb and from the cradle, that is, from the first and most tender period; she at once takes the helm and sits as it were in the stern, and guided by her sight, or the signs of the way, she directs the whole course of the vessel. Or, to put the matter differently, as soon as she begins to act, she at once proclaims and makes herself the cause, the chief pleader and the judge; and she forms her public state and guards as her own with watchful care, the effects in the body; that is to say, she first watches over those effects that follow naturally, and then, as the body grows, she forces its affections within the sphere of her own reason.

That she is studious of the affairs of her world and looks out for its welfare, is not unknown even to our senses, which borrow from her as their effective cause, that is, from her desires and decisions, the beginning of their own modes or mutations. It is clear therefore from our consciousness of effects that she presides over her body and is associated with that body; or, that she is enclosed in her brains, and girded about and enveloped with the bones of the cranium. That she is the constant companion of her body and follows it from place to place, even to the ends of the world, to the Indies or to Persia; that she sails with us from every port, and, if you please, through the boundless ocean, nor ever deserts her natal kingdom or native country,—this can be assuredly inferred from every effect, action, sense and desire, and from the force, determination, and mode of the will therein. Wheresoever thou art, there is she in the sharing of thy works. She is conscious of all thy motions. She is thine, and none other's. What is thine is also the soul's; and what is the soul's is also the body's and thine. What is predicated of thee, is predicated of one unanimous subject, that is to say, of the soul and the body jointly. For cause and causate, efficient and effect, conatus and motion, will and action, the first in a series and the last,—all stand for one cause; and the whole microcosm is one single series, although made up of innumerable other series, connected and unanimous. And since the connection is of such a nature, therefore, all the parts draw a common breath; they live simultaneously in the series and the bond; each part is sensitive, nor is there a single membrane,—provided only it be in the connection,—that is not sensitive when touched. If the general weal is in any way threatened with ruin or convulsed; or if a single part fails or decays, the soul, immediately aware of this, is saddened and grieved; and she brings what aid she can, to the tottering, falling or dying republic over whose goverance she presides. In a word, soul and body are conjoined in such great friendship that, while they live together, there is nothing that belongs to the part but belongs to the whole. Therefore, the soul which thou carriest with thee is enclosed in her own place and

world whithersoever thou goest,—but there she resides in her own court, being in the supreme place. It follows, therefore, from the above, that the body is in dependence on its soul, and the soul in dependence on her body; and that the latter is not a substance purely simple, and thus an imaginary something, of which neither place nor connection nor extension can be predicated; consequently, she would not be the same if there were no world or no body.

75. That the soul is within the circle of nature, and in our world and body and thus in place, follows still more evidently from the fact that she cannot be loosed from the coils of her body until, by the death and final doom of the latter, its bond is broken or untied. As soon as this body has lived its day, then the soul at once soars away and flies as from chains and a prison house, as though from her own place. And then all the bindings, nervous and tendinous, straightway become flaccid; the membranes and cords are laid prostrate; the powers of the muscles fail; all the heat and continuity of tension in the blood disappears; consequently all the bodily sensations which exist in common with the soul, perish, and their very organs are given over to death. Then, with the loosening of the reins, the soul for the first time is released from her guards and departs from her kingdom,—a sign that she is bound in with her body and enclosed in its little cells and membranous bosoms; differently than would be the case were she a simple substance, which, it would seem, could not possibly be thus incarcerated, and still less could occupy place in its brain during the period that it is still unstripped of the membranous connections of its body. Therefore, the soul awaits the last day of those series which are her subjects and servants; and when these lose their natural harmony, then the body is said to undergo the last struggle, to take the last breath, to yield up the ghost, and to breathe out its vital aura.

76. When the body has thus finished the drama of its years, and the soul has lost the use of sensations held in common with its body and the organs thereof, the soul then flies away or migrates as from her palace. But she does not, therefore, live in exile outside the world; or occupy some

seat above or below nature. On the other hand, gaining a freer field, she then, in suitable accordance with her own nature, extends her range into the vast heaven;* and verily, she is raised higher into the heavenly aura in the degree that she has been formed in her microcosm more purely and holily, and in better accordance with the genuine state of the causes of her heaven and her principles. The effigy of her body with its motions and effects still remains in her, being most purely impressed as causes, on her highly simple and modifiable substances,—not unlike as the figure of a tree with all its vegetation is impressed on the seed. And whatever habit or nature of instinct she has contracted by exercises by the medium of the body, is then represented in the soul to the very life. If, therefore, under the provident grace of the Deity and by the practice of virtue, the soul has been so formed in her body, according to the principles of morality conjoined with faith, that is, according to the inmost causes and the unique truths of heaven,—for the receiving of which the soul in a state of greater integrity is an adequate subject,—as to be in the habit and instinct as it were, to will nothing but what is conformable with those genuine and purest causes, then she is a most fitting subject, organ and instrument of heavenly modes, highly harmonic and almost instantaneous. Thus heaven, which is perpetually vivified by like souls, being supremely consonant with her, creates for her ineffable gladnesses and delights, with which the delights of the grosser world, which come from impure, mixed, and for the most part discordant and sluggish modulations, cannot be compared. But of these matters we shall treat elsewhere.

77. From the above it now follows that the soul is in the world, and that, by the mediation of nature she is in connection with her body and in harmony with her purest world or heaven; that is to say, that she is within the limits of nature, and is finite, being on the one hand, bound in, with her microcosm, and, on the other, contiguous with heaven, and

**Coelum*. This word, like its sky, or sidereal heaven. English equivalent, means also the

dependent on the heavenly aura; consequently that she is an entity of the purer as well as of the grosser world; and that by means of the grosser world, to wit, while she is living in society with her body, she is to be formed according to the state of the purer world. Thus she is in place, in time, and in origin, and also in the power and force of suffering and acting.

78. We are deceived and mocked by our senses, which belong to the more imperfect sphere; and these by their atmospheres, which are so remote from the purest atmospheres that a comparison can hardly be instituted between them, except by higher ratios and analogies. What in them is a unit or minimum, may be an aggregate, product or maximum in the purer senses and auras. The series of the grosser senses may commence where those of the purer senses terminate. The least degrees and moments of the sight and hearing may be as it were the greatest in the soul. That is to say, within the least moments of the sight and hearing there may be formed in the purer organisms thousands or myriads of like moments, of which we are not made conscious unless the products of the modifications be adequate to the modes of those grosser senses whose moments and times can be observed; all the rest lie concealed as though devoid of times, moments and degrees. We are conscious only of effects compounded of an infinitude of least effects, and of series existing from causes multiplied or subordinated through many series. And when we are not conscious of the causes, we think that they have no degrees, moments, laws, successions and series. This then is the reason why we take refuge in substances consisting of nothing, which substances cannot be any thing, since "nothing and something are mutual contradictions."* For, as said by the illustrious philosopher of our age, CHRISTIAN WOLFF, in his *Ontology*: "If you assume nothing, howsoever many times you choose to assume it, what is assumed is nothing and not something" [n. 601]; and again, "He who knows empty terms knows nothing; nor does he understand why a thing is, since

*Wolff, *Ontology*, 60.

nothing is falsely assumed as the cause“ [n. 64]. Furthermore, “If nothing is assumed, it is not therefore to be admitted that it is something” [n. 69]. “If something is assumed as being, it must also be assumed to be something; for nothing is without a sufficient reason why it is, rather than is not” [n. 70].

79. Meanwhile, the fact that the soul is bound and annexed to its body, and is coterminous with the series thereof, can be evidenced in no better way than by the anatomy of the animal body. For if we arm the sensation of sight with glasses, and enlighten the perceptions of the soul with sciences, it will become evident both that there is nothing in the body but has a continuous and contiguous connection,—continuous by means of membranes of divers kinds, and contiguous by as many liquors and fluids,—and that the soul carries the office of agent, efficient and modifier, that is, of principle and cause, and the body the office of patient, effect, principiate or causate.

In order to demonstrate that almost all things in the animal body are membranous and thus continuous, we must commence from the ovum. The ova of women are girded about by the purest of tunics and maters, while the testes† and ovaries themselves are contextured of an orderly juxtaposition of membranes. When the ova are vivified, and the enclosed embryo, with all the power and force of its genitor, is expanded, then tunics appear to the sight and touch, and gradually thicken. For the embryo is at once surrounded with the amnion and chorion, and at the head, with a placenta, or with several placentas, and also, in the case of brute animals, with a farciminal or allantoid membrane; to say nothing of the twisted umbilical cord. All these are nothing but tunics, deriving their origin from the ovum, etc., which at first are of the utmost fineness, but which gradually grow coarser, and finally become harder and harder; and this, to the end that active elements and atmospheres may aptly form them after the likeness of their own series, in accordance with the nature

†The old anatomists frequently denominated the ovaries testes

of their pressures, actions and modifications. To say nothing of hydatids which are likewise fashioned as tunics and bullæ with enclosed serum.

Scattered everywhere throughout the series of the body are glands which secern and distill liquors, and purify and refine the distillations, that they may be adapted to their own places, and may supply defects whenever any parts in the series, where-soever situated, have need of reintegration. These glands appear to be spheroidal forms, and each is enclosed in its own membrane. In them, moreover, are also seen a conglomeration of lesser and simpler glands, so interwoven with their membranes, that they present the appearance of a glandular congeries as it were, of which the texture of the larger glands is compounded. Such, for instance, is the pituitary gland in the sella equina, which is girded about and suspended in the dura mater,—here so attenuated as to be almost a pia mater. Not to mention many other glands, all of which exist for the purpose of securing menstrua suitable for the renovation of their own parts, or of filtering juices that shall suitably permeate and distend their membranes. Hence we have glands of many kinds, mucilaginous, lymphatic, salivary, ceruminous, sebaceous, lachrymal and so forth; all of which, by reason of their diverse offices, differ in color, figure and use. But respecting these, see the works of the learned on adenology.

The substance of the fat secreted from the blood and other liquids, consists of nothing but conglobate parts, and each of these of membranous cells and loculi; so likewise the marrow of the bones, and the individual parts thereof, which are still subtler. To say nothing of the vessels, vesicles and other follicles. The muscles consist of fleshy fibres. . . .

[HERE THE MS. ENDS.]

THE BRAIN.

BY EMANUEL SWEDENBORG.

(Being a first draft of Volume II of the *Economy of the Animal Kingdom*.)

92. To resume. When the individual cortical substance puts forth from its every part, a fibre of its own degree, this latter never pursues its course solitary, but from its very origin at once joins itself with companion and helping fibres. Hence from a number of lesser fibres is composed one [larger] fibre. These latter also, taken together, unite themselves, fascicle-wise, and at once compact into a larger or nerve fibre. These again unite into a larger fibre; and at last these larger fibres are immersed in the medullary lake of the cerebrum. Hence come the so numerous processes and peduncles, not unlike to those of the cerebellum, which proceed from the conglomerated congeries of the racemose cortex. This is apparent in a dissected portion of the cortical substance of the cerebrum wherein, according to Malpighi, are seen interspersed fibres and the figure of a tree, such as is found in the cerebellum. It is also evident from the primitive medullary substance which arises in bundles from an entire bed of cortical substance, and then enters into its own places below the spacious medulla of the centrum ovale. Hence fascicles emulative of nerves are frequently seen in the cerebral medulla; and here and there the medulla itself appears as if lamellated,—a condition which is especially conspicuous in hydrocephalic brains. The like is met with in the medulla of the spine, where congeries of the fibrils that proceed from the axillary ash, at once emerge as beginnings, and gradually as fascicles. In order to the doing of this, the cerebral cortex is partitioned off into beds and apartments which, taken together, form winding processes leaving spaces on either side for the arteries and arterial meshes.

93. These numerous fascicles or peduncles of the cortical

substance, placed in mutual juxtaposition, are at once clothed with a tunic borrowed from the pia mater, but of the utmost delicacy. Whence it follows that this tunic, inserted in so many places into the medulla, clothes its own fibres, just as it also clothes the still simpler fibres,—though not until it has been purified to that degree,—and likewise the most simple. Thus the common membrane of the cerebrum is exalted by like degrees as the fibres and cortical substances with their arteries. Hence such is the connection between them all, that there is a unit in the compound, and the common mater is also the mater of the parts.

94. If we suppose each single spherule of the above-mentioned substance to be most highly active all the way from its centre, and to carry on perpetual alternations of spiration; it then follows that an entire congeries of such spherules carry on the like animations, but in a compound; for granting the animation of the parts, the animation of the aggregate and whole is also granted. The effect is, therefore, felt by every fascicle dependent on a congeries of spherules,—a simple effect from the simple spherule, and a compound effect from composition of many spherules. That the voluntary force of muscles depends on this expansion of the cortical substance in the cerebrum will be confirmed by many considerations in the following pages.

95. This is more conspicuously apparent in the cerebellum, where the cortex holds itself attached to the accompanying membranes and vessels according with every form described by the circumambient and self-insinuating pia mater. The inner position is always left for the fibrils flowing down from the superior and lateral region; and these, by their marked whiteness, assume here and there the shape of foliage, branches and trunks. By such connection of all the spherules with their membranes, from the highest to the lowest, and of all these with the trunk, there arises a single structure and a concordant action thereof. Thus when the part acts, the parts act; and when the parts act, the whole acts; and from the whole there flows a unanimous effect. The case is different in the

cerebrum, where the part and the parts are able to act without a like effect redounding to the whole; and this in order that there may be command over the several members and muscles according to a previous will and determination.

96. These processes of the cortical substance of the cerebrum, skilfully drawn and depicted by Ruysch, form between them a certain continuous interstice whereby all the serum distilled from the arterioles betakes itself to its exits, and sometimes, when the arachnoid is ruptured, to the space between the coarse and fine meninges;* likewise also in the neighborhood of the peduncles, between the laminated strata of the cerebrum. These interstices, since, owing to the implications, they resemble a sponge, take up no other than the grossest liquor, or that which accompanies the blood; nor do they contain the animal fluid, which runs solely through the fibres of this sponge.

97. And because fascicles of fibres are clothed with their own proper tunic, it would seem that between them also can flow their own fluid, though not the verimost animal fluid. When this liquor is abundant the connections are loosened and the fibres become soft; as is the case in dropsical and paralytic subjects, or those in whom there is a resolution of the nerves. When the fascicles are compacted into a still larger nerve they furnish room also for arteries, veins, lymphatic vessels, muscular fibres, and the like.

98. But being expounded in a few words, these points are perhaps too obscurely set forth. The many practical considerations given in the following pages must confirm the Theory, so that in the end it may be clear whether it is truth or conjecture.

*That is the dura mater and the pia mater.

(To be continued.)

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No. 3

THE WORKS

OF

EMANUEL SWEDENBORG.

WRITTEN PRIOR TO 1746, INCLUDING A FEW OF LATER DATE.

NOTE.—Plain type indicates works out of print; small type, works in MS. only. C. L. = Chronological List by A. H. Stroh. Doc. = Tafel's Documents concerning Swedenborg. H. = Hyde's Bibliography. Tr. = Translated. R. A. S. = Royal Academy of Sciences of Sweden.

The following list of works by Swedenborg, written prior to 1746, has been prepared by the undersigned in accordance with instructions received from the Directors of the SWEDENBORG SCIENTIFIC ASSOCIATION. The reader will observe the large number of works, some of them of the first importance, that are now out of print; and also the large number that are available only in MS. form.

ALFRED ACTON.

COLLECTED WORKS.

- A. **Scientific and Philosophical Treatises**, paper, v. I, \$1.00; v. II, \$0.50
B. **Opera de Rebus Naturalibus** (Royal Academy of Sciences):
 I. *Geologica et Epistolæ*paper 3.00*
 II. *Cosmologica*paper 3.00*
 III. *Miscellanea de Rebus Naturalibus*.....paper 3.00*
C. *Opuscula Philosophica*, London, 1846.
D. *Posthumous Tracts*, tr. J. J. G. Wilkinson, London, 1847.
The above will be referred to as A. B. C. D.

LITERATURE, ART, POETRY.

- Plan for a Society of Sciences (Swedish), 1 P. 2.
Necessity of an Observatory (Swedish), 1 P. 3-6; copy in R. A. S.
Formation of a Literary Society (Swedish), 1 P. 1.
Historia Sueciæ Antiquæ (short excerpts), H. 143; copy in S. S. A.
L. A. **Senecæ et P. Syri Selectæ Sententiæ** (facsimile) ..paper \$1.00*
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Journal of Travels, tr. 2 Doc. 3-130.	
Excerpta de Italia, 7 pp., H. 250.	
Almanacka for ar 1752 (facsimile with Swedish notes) . . paper	.30*
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Institution of Salt Boileries (Swedish), 1 P. 74-7; copy in R. A. S.	
Mining of Copper and Iron (Swedish), H. 209.	
Translation, in 1 Doc. 475-6.	
Establishment of Paper Mills (Swedish), 3 pp., C. L. 89.	
The Production of Iron (Swedish), H. 213.	
Translation in 1 Doc. 477-480.	
Establishment of Rolling Mills (Swedish), H. 211.	
Translation in 1 Doc. 480-2.	
Welfare of the Country (Swedish), 1 P. 7-18.	
Declaring War against Russia (Swedish), H. 257.	
Translation in 1 Doc. 486-498.	
Liquor Traffic in Sweden (Swedish), H. 935.	
Translation in 1 Doc. 494-5.	
Improving Commerce and Manufacture (Swedish), 1 P. 66-73; copy in R. A. S.	
Swedish Money and Measures (Swedish), 8 pp., <i>Stock.</i> , 1719; 1795.	
Delasement and Rise of Swedish Money (Swedish), 20 pp., <i>Stock.</i> , 1722; 2d edition with Reflections, 70 pp., <i>Upsala</i> , 1771.	
The Balance in Hand (Swedish), H. 207.	
Translation in 1 Doc. 471-4.	
Return to a Metallic Currency (Swedish), H. 1537.	
Translation in 1 Doc. 497-503.	
Restoration of Coinage (Swedish), H. 1540.	
Translation in 1 Doc. 504-5.	
Course of Exchange (Swedish), H. 1550.	
Translation in 1 Doc. 505-6.	
Export of Copper (Swedish), H. 1552.	
Translation in 1 Doc. 507-8.	
Addresses to Diet on Nordencrantz's Book on Government (Swedish), H. 1554; C. L. 388; H. 1568.	
Translations in 1 Doc.; 511-515; 525-8; 534-5.	
Review of Nordencrantz's Book (Swedish), H. 1568.	
Translation in 1 Doc. 516-520.	
Letters on Same (Swedish), Cod. 56.	
Translations in 1 Doc. 521-2; 523-533.	
Address to Diet on Army (Swedish), tr. 1 Doc. 536-7.	
Preservation of Freedom (Swedish), H. 1571.	

Translation in 1 Doc. 538-542.

Memoir of Charles xii (Swedish), H. 337.

Translation in 1 Doc. 558-565.

MECHANICAL AND PHYSICAL SCIENCES.

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- Utkast til en Machine at flyga** (in *Dædalus Hyperboreus*, pp. 80-3)paper 2.00*
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- Description of a Crane* (Swedish), 1 P. 102-4.
- Om Echo*, 1 P. 205-6.
- The Tin Work in Stiernsund* (Swedish), 4 pp., *Stock.*, 1717.
- Improvements at Carlsrona* (Swedish), 1 P. 127-9, 206.
- Docks, Canal Locks and Salt Works* (Swedish), 8 pp., *Stock.*, 1719.
- Excerptum ex Polhemio*, Cod. 86, p. 277; copy in S. S. A.
- Excerpta ex Musschenbroek de Attractione Capillari, et de Cohærentia Solidorum etc.*, Cod. 86, pp. 205-215, 218-231; copy in S. S. A.
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- Scientific Correspondence*, 1709-1747, tr. 1 Doc. 200-369.
- Inventio Nova Camini** (in 3 B. 191-9)paper 3.00*
- A New Kind of Stove* (in *Chemistry*, 206-211).
- Memorials on an Air Pump* (Swedish), 7 pp., C. L. 207, 208.
- Mem. on Machines for Mining* (Swedish), 3 pp., C. L. 206.
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- New Rules for maintaining Heat in Rooms* (in *Miscellaneous Observations*, 153-9).
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- Excerpta de Aqua Cæmentaria Hungariæ*, 6 pp., H. 227.
- Printed in De Cupro*, pp. 58-9.
- Pondera* (definitiones), Cod. 37, p. 28; copy in S. S. A.
- Experimenta Physica ex Desaguille*, 6 P. 102-3; copy in S. S. A.
- Inlaying Tables* (Swedish), in *Trans. R. A. S.*, xxiv, pp. 107-113.
- Translation in 1 Doc. 536-590.

MINERALOGY AND CHEMISTRY.

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- Stereometric Proportions (Swedish), 1 P. 100-1.
 Ex Musschenbroeck de Cohærentia Metallorum, H. 143; copy in S. S. A.
- Swedish Blast Furnaces** (Swedish), *Stock.*, 1903 1.55*
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 Later Memorials (Swedish), C. L. 159, 166.
 Translations in 1 Doc. 411-3, 421-5.
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 Miscellaneous Observations, tr. C. E. Strutt, *Lond.*, 1847.
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 De Cupro, *Dresdæ et Lipsiæ*, 1734.
 Copper and Copper Ore; MS. tr. by A. H. Searle, H. 233.
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 Tr. du Fer, tr. M. Bouche, in *Descr. des Arts et Metiers*, Paris, 1762,
 v. II.
- Definitiones in Mineralogica (minerae, fornaces, instrumenta, machinae), Cod.
 37, pp. 1, 2, 5, 7, 8, 10, 12, 13, 24, 70; copy in S. S. A.
 De Colore (definitiones), Cod. 37, pp. 15-6; copy in S. S. A.
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MATHEMATICS.

- Algebra in Ten Books** (Swedish), 186 pp., *Upsala*, 1718.
 A New Arithmetic with 8 as a Basis instead of 10 (Swedish); phototyped in
 Swedenborgiana, I, pp. 27-54.
 Arithmetica et Geometrica, 2 P. 1-98.
 Calculus, 2 P. 93-7.
 Sciagraphia Operis Mathematici, 2 P. 98-100.
 Ex Mem. l'Acad. des Sciences, 1733 (Latin), Cod. 86, p. 277; copy in S. S. A.
 Definitiones in Geometrica, Cod. 37, p. 200; copy in S. S. A.
 Mathematica in Compendium redacta, 3 P. 175-8; copy in S. S. A.
 Regule Motus, Cod. 37, pp. 226-7; copy in S. S. A.
 Regule Motus ex Wolfio, Cod. 37, pp. 249-253; copy in S. S. A.
 Harmonia Musica (mathematice considerata), 3 P. 178-9; copy in S. S. A.
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Cincinnati, 1858; 3 vols in 1, *St. Clairsville, O.*, 1850.
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SWEDENBORG SCIENTIFIC ASSOCIATION,
Bryn Athyn, Pa.

TRANSACTIONS
OF THE
TWENTY-SECOND ANNUAL MEETING
OF THE
SWEDENBORG SCIENTIFIC ASSOCIATION.

1. The Twenty-second Annual Meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION was held in the Church Building of the First New Jerusalem Society in the city of Philadelphia on Wednesday, May 14th, 1919. President Lewis F. Hite occupied the Chair.

AFTERNOON SESSION 2:30 P. M.

2. On motion, the minutes of the Twenty-first Annual Meeting, as published in the NEW PHILOSOPHY for July, 1918, were adopted.

3. The Report of the Secretary was read, and it was Resolved that the report be received and filed.

4. The Chair appointed Mr. Donald F. Rose a Committee on the Roll. The Committee, later in the meeting, reported an attendance of twelve members and seventeen visitors.

5. The Chair appointed Messrs. John Whitehead, L. E. Gyllenhaal and Wm. B. Caldwell a Nominating Committee to report as soon as they were ready.

6. The Report of the Board of Directors was read.

The Board reported that during the past year it had held two formal and a number of informal meetings.

At the meeting held on May 31st, 1918, the officers of the preceding year were re-elected.

At the meeting on May 14th, 1919, it had been agreed that a complete list of the membership of the Association be incorporated in the Transactions of the Twenty-second Annual meeting. A communication from Mr. Alfred H. Stroh, dated Upsala, Jan. 20th, 1919, had been received and read to the Board. It was resolved that the publications

of the Association be sent to a number of public libraries to be selected by the Editor and Treasurer. Two papers had been sent to the Board by Professor Very, and it was resolved that one of these would be ready for presentation to the Annual Meeting if called for. The Auditing Committee reported that the Treasurer's accounts for 1917-18, and 1918-19, had been examined and found correct.

7. It was Resolved, that the report of the Board of Directors be received and filed.

8. The Report of the Treasurer was read (see p. 392).

9. After reading his Financial Report the Treasurer made an oral report on the membership of the Association.

As compared with last year, the Association has had a successful year as regards membership. The statistics were as follows:

Total net membership on May 31st, 1918	187
New members	11
	— 198
Resigned	4
Died	3
Lapsed	7
	— 14
Net membership May 14th, 1919	184

There had been an increase in the number of paid subscribers to the NEW PHILOSOPHY, the present number being 199, including 18 who are not members of the Association.

During the past year there had been a considerable increase in the sale of books. The Association's own publications have increased, and many of our members have taken advantage of the generous offer made by our New Church publishers to sell their publications,—with certain exceptions,—at half price to all members of the SWEDENBORG SCIENTIFIC ASSOCIATION. The sales during the past year are as follows:

The Fibre	92
The Fibre, sent for review	19
The Senses	37
Beekman's Return Kingdom	16
Summary of Principia	8
Generation	3
Economy of Animal Kingdom (2 vols.)	2
Rational Psychology	8
Scientific and Phil. Treatises	11
The Brain (2 vols.)	1
Worship and Love of God	1

Tremulation	I
Ontology	I
Motion of Earth and Planets	I
The Infinite	I
History of Creation	I

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Of the works in the above list, the Treasurer stated that the "Motion and Position of the Earth and Planets," and "The History of Creation" are now out of print.*

10. Mr. John Whitehead asked how much trade discount would be allowed to dealers handling the publications of the Association.

11. The Treasurer answered that he supposed the Association would allow the discount usually given in such cases.

12. It was Resolved, that the Report of the Treasurer be received and filed.

13. The Report of the Editor of the NEW PHILOSOPHY was read (see p. 394).

14. It was Resolved, that the report be received with congratulations to the editor, and filed.

15. Mr. John Whitehead spoke of the importance of arousing a wider interest in the work of the Association. He thought a considerable step would be taken in this direction if the meetings of the Association were held in connection with the General Convention. It had been said that the SWEDENBORG SCIENTIFIC ASSOCIATION is a connecting link between the Convention and the General Church, and he thought that meeting at times in connection with the meetings of the Convention would serve to make it more really a connecting link. Swedenborg's philosophy is the foundation on which rests the Revelation to the New Church, and the promotion of the publication and study of this philosophy should enlist the support of all members of the Church. It would be an unfortunate thing that we were incorporated if thereby we were prevented from meeting outside Philadelphia. There had just

*Since the Annual meeting we have been officially informed that the work on the Brain is now also out of print.

been an interesting meeting of the Convention at Washington. Had the Association's meeting been held in Washington in connection with it, we should have had a good attendance of Convention members. He did not know what the remedy was, but he was sure that a remedy ought to be found.

16 Mr. Doering stated that there was nothing in the articles of Incorporation to prevent the Association's holding its meetings at any place outside Philadelphia.

17. The Nominating Committee reported that they had nominated for election the same officers as last year.

18. It was moved by Mr. Caldwell and duly seconded and carried, that the Secretary cast the ballot for the nominees.

19. The Secretary announced that the officers nominated had been duly elected.

20. Mr. Acton, referring to Mr. Whitehead's remarks, stated that it had been the policy of the Directors of the Association to observe an entirely neutral policy as regards being identified with any particular body of the New Church. It was for this reason that meetings were held in Philadelphia, for we would be assured a much larger attendance if the meetings were in Bryn Athyn. With regard to meeting in connection with the Convention, the adoption of such a policy would involve also meetings in connection with the General Church.

21. Mr. Doering called attention to the fact that when the meeting of the Convention had been appointed for Boston the Association had signified its willingness to hold its annual meeting in connection therewith; but they had been informed that no time could be given in the Convention programme for such meeting.

22. Mr. Caldwell called attention to the fact that next year the Convention would hold its annual meeting in New York. He therefore moved, and it was duly seconded, that the Association hold a meeting next year in connection with the meetings of the General Convention. This resolution, he noted, would not necessarily mean that the annual meeting of the Association be held in New York.

23. Mr. Acton objected to binding the hands of the Association for next year. He therefore moved as a substitute that the Board of Directors be directed to consider the question of arranging for a meeting of the Association in New York at the time of the Convention meetings in 1920.

24. The mover and seconder of the original motion accepted the substitute, which was then put to the meeting and carried.

25. President Lewis F. Hite read his Annual Address, the subject of which was "The Study of Swedenborg's Science" (see p. 387).

26. Professor Reginald W. Brown read a paper on "The Fundamental Conception of Substance and of Its Form and Activity" (see p. 398).

27. Professor Acton addressed the meeting on the subject of Codex 36.

Codex 36 is one of the Swedenborg MSS. preserved in the Royal Academy of Sciences of Stockholm. It contains extracts from the philosophers, particularly from Aristotle, Plato, Malebranche, Leibnitz, and Descartes, on the subjects of God, the Soul, the Intercourse between Soul and Body, and other related matters. Mr. Acton gave a general description of the contents of the MS., and also read several extracts. He dwelt on the importance of this MS. as showing something of the means by which Swedenborg was led to the formulation of his great doctrines which were the preparation for the revelation given to the New Church. The MS. itself is now in process of translation and will be published in the *NEW PHILOSOPHY*.

28. Professor Very's paper was not read on account of the lateness of the hour, but it was ordered printed in the *NEW PHILOSOPHY* (see p. 413).

29. Messrs. Whitehead and Acton spoke on the subject of the papers that had been read.

30. It was unanimously Resolved, that the thanks of the Association be given to the pastor and members of the First New Jerusalem Society of Philadelphia for the use of their building for the meeting of the Association.

31. The meeting adjourned at 5:30 P. M.

REGINALD W. BROWN,
Secretary.

THE PRESIDENT'S ADDRESS.

THE STUDY OF SWEDENBORG'S SCIENCE.

Swedenborg's scientific experience was extraordinary in more ways than one, but it was unique as furnishing the groundwork of a spiritual experience and a spiritual understanding, which enabled him to interpret for the first time human life, and above all the Lord's life, in the full light of the Lord's own Word. On the basis of this scientific experience, he was able to develop a body of spiritual psychology, a psychology of regeneration, such as Augustine never dreamed of, still less any of his successors.

But, more than this, Swedenborg's scientific experience did not end where his spiritual experience began; on the contrary, it supports and pervades the whole extent and the highest reaches of his spiritual thought. This fact makes Swedenborg's universe a systematic whole, and the unifying principles of his system is his concept of love. It was his experience of the nature of love that revealed to him its metaphysical and logical significance, the significance which he summed up in the simple formula; love is substance, God is love, the universe is love, but he gave a new meaning to this formula. The meaning which he himself intended, and which the reader must grasp, gives a new start in metaphysics and theology alike. It is concisely stated by reversing the terms of the formula and saying: love in its whole extent is the universe, love at the highest and in its purity is God, the Lord, substance is love.

If any doubt arises as to the correctness of this latter form of statement, consider the fundamental meaning of the following: love and wisdom are one, and that one is love; an end is a given state of love; the end is in the cause, the cause is in the effect, and the end through the cause is the all of the effect; affections are particular states of love, and thoughts are forms of affections; affection, thought, and act are as end, cause, and effect; love is willing, thinking, and acting; the universe consists of the Divine, the spiritual, and the natural; and these are as end, cause, and effect; love, wisdom, and use

are one, and that one is love, in its three universal degrees; angels are loves and wisdoms; men and animals are forms of affection; plants and minerals are forms of uses; there are degrees of love, successive and simultaneous, and degrees within degrees.

Here it is obvious that the universe has its unity, order, and system in the nature of love as the fundamental and all pervading reality. It is equally obvious that the study of Swedenborg's science is involved in every step of our progress to the higher levels and to the interiors of this universe. In other words, the study of Swedenborg's science is a study of the whole universe.

The next observation to be made is that the study of Swedenborg's science must proceed in the light of history as well as in the light of his own thought. Swedenborg's science touches history at two points; at the point of his own personal contact with history, and at the point of the contact of his science with the science of to-day. There can be no satisfactory reading or interpretation of Swedenborg's science apart from the assistance rendered by both these points of contact, and evidently this involves an intimate acquaintance with the whole history of science up to and including the latest and most advanced stages. Such an acquaintance with the history of science would require the co-operation of a body of highly educated specialists, "the whole college" that Emerson spoke of, and which might be provided in a fully equipped New Church university.

The point of precise personal contact of Swedenborg with history in the large sense, and not merely with his contemporaries and the sciences of his day, is the language in which he wrote, *i. e.*, mediaeval and scholastic Latin. As to his contemporaries, if we recall that the span of his life included Newton, Boyle, Berkeley, Leibnitz, Kant; and that he made a special study of Wolf, the man who summarized and systematized the philosophy of his period which was for the most part the philosophy of scholasticism, we indicate sufficiently well for our present purpose his historical opposition. As to

the sciences, there is no doubt that Swedenborg studied eagerly the leading mathematicians and physicists, and especially the physiologists, of his day; "I study Newton daily," he wrote his brother-in-law; he also sought the personal acquaintance of such men. In this context, we must read and study him; but the critical and permanent background of our study must be the language in which he wrote, the mediaeval and scholastic Latin of his day and generation; and let us bear in mind that this language was the most highly developed instrument of scientific and philosophic expression which the intellect of man had as yet forged—forged in the first place by Greek thought, by Plato and Aristotle, and then developed by generations of scholars, who used the regularity and precision of the Latin language to formulate the scientific experience of after ages in accordance with the models set by the Greeks.

Science, since Swedenborg's day, has made immense progress, especially in mathematics, mechanics, and physics; but there has not been corresponding progress in reshaping language and concepts. Many new terms have been introduced in some of the natural sciences, such as chemistry, physics, and biology; but comparatively little has been done in this direction in the fields of philosophy and the sciences of mind, in psychology, above all in spiritual psychology. So that in the main we are still dependent for scientific expression, fundamentally, upon the concepts formulated by Aristotle, and upon the polished and ordered language of the scholastics.

This, then, is the situation for the student of Swedenborg's science; he must know the historical and scientific value of the language Swedenborg used; he must know the scientific and philosophical vocabulary of the language; he must interpret what he reads in the light of its own history, in the light of the most recent scientific achievements, and in the light of Swedenborg's own thought and purpose. This implies that we must read Swedenborg in the original Latin; the reading of translations will in various degrees and particulars fail to reach the precise thought. All translations are more or less inadequate, and the translations of Swedenborg are seriously and unduly faulty.

But, after all, the standing and obstinate difficulty in the study of Swedenborg's science is inadequacy of language itself. For given the requisite acquaintance with history and science, and with the outlines of Swedenborg's philosophy of the universe, the fact remains that neither scholastic Latin nor the modern languages afford the terms or the concepts adapted to lead us into the higher and more intricate realms of Swedenborg's thought. There is no doubt that Swedenborg himself struggled constantly with this difficulty, and this is in part at least the explanation of the baffling paucity of his terms. As Professor James expressed it, his heads of classification were too few. As I have suggested and insisted on various other occasions, we need a revised and reconstructed vocabulary, new terms; and new concepts. The problem here is to pass from Swedenborg's terms to his thought, and from his thought to the concrete experience the thought is meant to deal with. At this point, the latest phases of modern science come to our aid, and help us to pass directly to the experience which our language and thought are meant to interpret. In all cases, the approach to experience through language and thought is mostly indirect; the experience is often hopelessly remote. In the field of physics, in the field of the "Principia," for instance, the ground of experience seems to be exceedingly remote; in the field of physiology it is hardly less so; but in the field of psychology, the field of the "Arcana," the body of experience referred to is immense and complex as well as remote. It is obvious that as we approach these remote fields, our ideas, concepts, and terms must receive extension and take new meanings. Good cases of the inadequacy here in question are the terms *point* and *aura* in the "Principia," the term *Animal spirit* in the "Economy," the term *soul* in the "Rational Psychology," and the term *perception* in the "Arcana." The historical meanings of these terms and the ideas and concepts they represent do not suffice to convey Swedenborg's thought, nor carry us to the experience Swedenborg had in mind. This is one reason why we may say that Swedenborg has never been read; though many partial attempts have been made to read him,

and even these attempts have been successful only in spots. Swedenborg himself was conscious, at times painfully conscious, of the inadequacy of his linguistic and intellectual instruments, so much so that in general it is characteristic of his method not to attempt formal definitions, but to trust to repetition, description, and variety of application, to make his meaning clear; he saw, of course, that definitions could only be given in the terms and concepts already fixed by tradition and usage, so they would have taken the thought of the reader away from the experience in view.

This difficulty of language out of the way, and the reconstruction of our conceptional apparatus accomplished, the next difficulty which the reader of Swedenborg and the student of his science encounters is the immense body of scientific knowledge required. The student sufficiently familiar with history and scholastic Latin, would be only through the *first stage of preparation*; he would then need his scientific and philosophical equipment, an equipment which very few could acquire, for lack of time not to say lack of ability and disposition. Students of the special sciences are apt to be very narrow in their interests and attainments; for this reason they are disqualified for a generous and comprehensive reading of Swedenborg's science. What is needed is an *insatiable thirst for universal knowledge* and *exhaustless energy for philosophical inquiry*.

The conditions demand what I am accustomed to think of and have several times proposed as *group study*. Imagine a group of advanced students, well educated in special lines, one in the history of science and philosophy, one in mediaeval and scholastic Latin, others in mathematics, physics, biology, physiology, and psychology; and suppose these to come together regularly for co-operative reading and study of Swedenborg's scientific works, beginning with the earliest and continuing on up to the "Rational Psychology." Each of these specialists would interpret that aspect of the text which he was best qualified in; one, the historical context; one, the linguistic questions, or the mathematics, or the physics, or the physiology involved, and so on. In this way combined, co-operative, work would be done with all the advantages of *group competence*.

In my opinion, it is in some such way that we may reasonably expect adequate reading and study of Swedenborg's science.

The Swedenborg Scientific Association is the proper body for carrying out such an idea, and the NEW PHILOSOPHY is the proper organ for publishing the results of such work. When the work of photolithographing and translating is finished, and a complete edition of Swedenborg's Scientific Works in the original and in translation, especially a Latin-English edition, is ready for use, the primary aims of the Association, the preservation and reproduction of the Manuscripts, the translation and publication of the scientific works, will have been accomplished; and then the task of reading, interpreting, and expounding the Works will be ours. In the meantime, we should be making preparation for this task; and this plan of co-operative reading and study is recommended as the way to secure the best preparation.

TREASURER'S REPORT

FOR THE YEAR ENDING MAY 12, 1919.

RECEIPTS.

Dues	\$182.90	
Subscriptions to NEW PHILOSOPHY	118.72	
Sale of Publications	269.80	
Contributions	298.50	
		\$869.92
Bal. on hand, May 31, 1918	671.30	
		\$1,541.22

EXPENDITURES.

Printing four issues NEW PHIL-	
OSOPHY, Oct., 1917; Jan., April,	
July, 1918	\$178.90
Plates for special articles	14.00
Paper	25.00
Cover paper	19.20
Envelopes and mailing NEW	

PHILOSOPHY	10.24	
Editorial Expense	4.55	
		\$251.89
Fibre, Printing	\$442.86	
Binding 100 copies	40.32	
Freight and expense	4.13	
		\$487.31
Return Kingdom, Printing	\$163.25	
Reprint, Annual Address	3.50	
Paper for Psychological Trans-		
actions	52.92	
Sundry expenses, postage, etc....	24.00	
Paid to Publishers for books for		
members	20.94	
		\$1,003.81
Bal. on hand, May 12, 1919	537.41	
		\$1,541.22
Balance includes Royal Academy		
Publications	\$10.00	
Dues unpaid, 1919	45.00	
Subscriptions unpaid, 1919	28.00	
Dues unpaid, 1918	14.00	
Subscriptions unpaid, 1918	8.50	
Dues unpaid, 1917	3.00	
Subscriptions unpaid, 1917	1.50	

54 persons owe dues and sub-
scriptions amounting to \$100.00

ACCOUNTS PAYABLE.

Binding Fibre, Senses, and Re-	
turn Kingdom	\$104.00
Publishing three issues NEW	
PHILOSOPHY	180.00
	\$284.00

Audited and found correct, 1919.

Respectfully submitted,

C. E. DOERING.

Treasurer.

REPORT

OF THE

EDITOR OF NEW PHILOSOPHY.

Since my last report four issues of the NEW PHILOSOPHY have been published, namely, July, 1918, to April, 1919, inclusive. These have included a total of 176 pages, making the average number of pages for each issue 44, or 12 pages in excess of the regular size. The increase was mostly in the April issue, and was made with a view to completing the translation of THE SOUL, and to printing in a single issue the editor's article, THE AURA OF A BETTER WORLD.

This increase in the number of pages in the NEW PHILOSOPHY means, of course, an increase in cost; but I am in the hope that the generosity of members of the ASSOCIATION will enable this expense to be met.

Thirty-two pages four times a year gives very little opportunity for the development of the literary work of the ASSOCIATION, and I trust that our members will make it possible, if not permanently to enlarge the journal, at any rate to justify the editor in increasing its size at times when the need requires.

The contents of these 176 pages comprises:

Transactions	20 pp.
Editorials and Reviews	18 "
Articles	62 "

Transactions:

The Brain	20
Post. Tracts	56—76 "
	—
	176 "

The work on the Brain, referred to in the above table, has never before appeared in print, the translation being made from the photolithographed manuscript. It is quite evidently a first draft or "first projection" of volume II of the ECONOMY OF THE ANIMAL KINGDOM; but when the latter work came to

be written the plan was so changed that the earlier draft constitutes practically an independent treatise. The work on the Brain, published by the LONDON SWEDENBORG SOCIETY some thirty-five years ago, is a translation made by DR. R. L. TAFEL from a manuscript written by SWEDENBORG after the work now under consideration; though Dr. Tafel also included a few excerpts from the earlier manuscript. The two works while necessarily very similar in some respects, are to a great extent of a very different character, and the publication of the earlier work will constitute a very considerable contribution to the study of Swedenborg's doctrine of the brain.

The three installments that have thus far appeared in our pages have been quite short, but now that the "Posthumous Tracts" is finished, I hope to devote a good deal of space to this work if time can be found to make the translation.

I would like to take this opportunity to acknowledge the generous and courteous help that has been extended to me by Dr. J. A. Bergstedt, the librarian of the ROYAL ACADEMY OF SCIENCES, of Stockholm. The manuscript of the BRAIN is incomplete, many of its pages being missing. In addition to this, there are 18 pages (9 leaves), which are torn lengthwise with only one-half of the pages preserved; but these preserved half pages are not included in the manuscript as photolithographed by DR. TAFEL. Ten of the torn pages contained excerpts from anatomical authors, and as it was probable that the missing writing of these pages could be restored, I wrote to the ROYAL ACADEMY OF SCIENCES requesting that a copy of the pages in question be made for the ASSOCIATION. In reply I received from DR. BERGSTEDT a manuscript copy, not only of the ten pages indicated in my request, but also of the other eight torn halves—the copy being the work of the experienced and capable hands of the Assistant Librarian, Miss GRETA EKELOF. Fortunately, by consulting the anatomical works used by Swedenborg, I was able completely to restore the missing portions of the first ten pages, and also to restore some small parts in the other eight pages; and it was a pleasure to be able to send these restorations to the ROYAL ACADEMY.

EMY OF SCIENCES as a slight acknowledgment of the kind courtesy of that learned body.

In the matter of book publications there is but little to report. The work on the FIBRE was put on the market last July, in a handsome volume, which does credit to the SWEDENBORG SCIENTIFIC ASSOCIATION, and which constitutes one of the most important contributions made by the ASSOCIATION to the fulfillment of its purpose to "translate, publish and distribute the Scientific and Philosophical Works of Emanuel Swedenborg." I suppose the Treasurer will report as to the sale of this work. I would, however, like to point out that this sale will depend very largely on our own members. Like many others of Swedenborg's works, the FIBRE, though dealing with a physiological subject, treats it not so much technically as philosophically; and the manner of the treatment is not, as is so often the case in learned works, to "speak simple things profoundly," but to "speak profound things simply." There are many profound and beautifully eloquent passages in the work, and it sets forth with great clearness several of the fundamental positions, an understanding of which is so necessary to a clear comprehension of the author's doctrines. The work should be of interest to a large circle of our members, whether medical or lay; and particularly that part of it which contains an external exposition of the author's Doctrine of Form; and also the part on Diseases of the Fibres, treating of the causes of hysteria, melancholy, insomnia, loss of memory, etc.

Turning now to future work, we hope in the coming Fall or early Winter, to publish a volume of Swedenborg's miscellaneous psychological works. This volume will include the six small works ordinarily known as "Posthumous Ttracts" together with the HIEROGLYPHIC KEY and a treatise on the "Doctrine of Representations and Correspondences." All these works, with the exception of the last, are already in print; and the last is in manuscript form fully prepared for the printer. I may remark that this last work, that on the Doctrine of Representations and Correspondences, is undoubtedly a draft

made in continuation of the Hieroglyphic Key. It has never as yet been printed in any language. The other works to be included in the volume were last published in English translation some seventy years ago, and now practically impossible to obtain. Moreover, readers of these works have greatly felt the lack of an index to their contents. This will be included in the forthcoming volume.

The consideration of this publication again brings to mind the question of cost; for though, as I previously reported, one of our members, Dr. Felix A. Boericke, has generously offered to defray the cost of printing the part on Representations and Correspondences, this will by no means represent the total cost of publishing the whole volume. I refer to this phase of the matter merely to emphasize to our members the needs of the ASSOCIATION in the prosecution of the work for which it was founded.

In some early issue of the NEW PHILOSOPHY, I hope to commence the publication of one of Swedenborg's manuscripts of which the ASSOCIATION owns a manuscript copy which it caused to be made some fifteen years ago. This manuscript contains copious extracts from Plato, Aristotle, St. Augustine, Leibnitz, Wolff, Malebranche, Descartes and other writers, on various philosophical subjects, such as the Soul, its Commerce with the Body, the Intellect, the WILL, GOOD, TRUTH, FREE-WILL, the NATURE and UNITY of God, etc. The publication of this manuscript, besides giving to the readers a most interesting view of those of the doctrines of most eminent philosophers, which arrested Swedenborg's particular attention, will also prove to be the most valuable single contribution ever made for the better understanding of the sources of Swedenborg's philosophy.

ALFRED ACTON

Bryn Athyn, May 12, 1919.

THE FUNDAMENTAL CONCEPT OF SUBSTANCE,
AND OF ITS FORM AND ACTIVITY.

BY PROFESSOR REGINALD W. BROWN.

The general and fundamental principles of ontology, that is to say, the universal and necessary characteristics of all being and existence, are in themselves so simple and obvious that we are apt to pass them by, and reach out for something that is more intricate and incomprehensible. One of the great marvels about the Writings of the New Church is the simple and wonderfully consistent ontology which they reveal. He who did not grasp the universal and fundamental characteristics of being and existence therein presented, might say that the Writings were full of contradictions, for so they appear to be on the surface. For instance, it is said in numerous places that love and wisdom, goods and truths, mind and memory, will and understanding, state and form, are substances; and again it is said in just as many places, and just as emphatically, that they are not substances. The reader of the Writings must perforce have some ontological background in order to understand rationally how such apparent contradictions are really consistent. The truth is that these apparent contradictions arise out of the simple fact that each of the terms referred to may be used, and is commonly used, in very different senses. It is this very fact, that terms are used in such different senses, that makes it extremely difficult to explain those universal and necessary characteristics of all being and existence, which in themselves, as we have said, are so simple and obvious.

I propose to attempt to explain what are the most fundamental and necessary characteristics of a substance. But I am face to face with the difficulty of which I have spoken, for there is probably no term used in so many senses as the term substance. We speak of substance in an abstract sense as that basic something, as distinguished from the form and other distinct characteristics which it possesses. We also speak of substance as including both the basic something and its form, but

as distinguished from its activity. This is a somewhat more concrete use of the term. And again we speak of substance as the thing formed and essentially active. This is the most complete idea of substance, involving, as it does, all its essential characteristics. Furthermore, we speak of the Divine substance as the only substance. Again we distinguish Divine substance from spiritual substance, and spiritual substance from natural substance. Even natural substances are divided into those which are substantial and those which are material. This vertumnal term substance may be used in any of these various senses and contrasted with that which is called by the same name in another sense. No wonder Swedenborg looked forward to a mathematical philosophy of universals, by which these distinctions could be expressed definitely by suitable symbols and ratios.

The uses of the term substance, as enumerated, fall into two very distinct categories; the first involves definitions of substance and universal characteristics which apply to all degrees of substances; the second category involves the various degrees and kinds of substances. I propose to deal particularly with the first, and to show that substance in its complete sense, no matter what its degree or kind, universally involves three essential or fundamental characteristics which cannot be separated from one other without destroying the idea of substance as a reality. These three characteristics are: 1. A basic something, out of which; 2. The form of it; 3. Its activity. The fundamental concept of a substance includes all three; three things which are distinguished as its *esse*, its *existere*, and its *essence*.

In order to emphasize these three essential characteristics of substance, and thereby the better to demonstrate their relationship in substance, I shall deal with them separately. A series of principles relating to each will be presented in the form of theses, followed by citations from Swedenborg's philosophical works and from the Writings from which they are drawn. For the most these citations are in parallel. First let us consider certain principles regarding activity; then corresponding

principles regarding form; and in the end I think that we will be prepared to understand better those which concern the third characteristic, and at the same time the complete concept of substance as involving all three.

ACTIVITY.

1. No activity (or motion) exists, nor can be thought of, apart from substance (or matter).

In his work on *Action* Swedenborg says: "No action can exist but from a substance; consequently the nature of the substance determines that of the action: thus the substantial form coincides with the form of the action." (XXIII.)

Changes of state are activities, and it is said in *Divine Love and Wisdom*, that "without a substantial form as a subject, changes of state are impossible, just as sight is impossible without an eye, or hearing without an ear." (273) The same principle is involved in the *Arcana Cælestia* when it is stated that "things are altogether according to the nature of the subjects, for they are of the subject, because produced by the subject; things separated from their subject, or from their substance, are no things." (801) The *things* specifically referred to in this statement are certain spiritual activities.

2. No activity or motion regarded in itself is substance (or matter), nor can it be called such except with the understanding that the activity presupposes a substance which is the subject of it.

This principle is clearly expressed in Swedenborg's *Ontology*, where he states that "Modifications themselves, which are changes of state . . . , although they are forms, still cannot be called substance, but only the operations of substance." (34) And further, that "We must conceive of active and motive force, and also of nature, after the manner of substance; but they are not substance; they only so appear. (35).

The same principle is expressed in *Divine Love and Wisdom*, n. 210, where it is said that "From its being possible to think of will and understanding, of affection and thought, and of charity and faith, abstractly from the substances which are

their subjects, and from their having been so thought of, it has come to pass, that a correct idea of these things, as being states of substances or forms, has perished. It is altogether as with sensations and actions, which are not things abstract from the organs of sensation and motion. Abstracted, that is, separate, from these they are mere figments of reason; for they are like sight apart from the eye, hearing apart from the ear, taste apart from the tongue, and so forth." (Comp. A. C. 3726.)

3. It follows that without substance or matter as its subject there is no such thing as activity or motion, and that therefore every form of activity presupposes its proper substance. Thus Divine activity presupposes the existence of Divine substance, even though that substance be incomprehensible to finite minds; spiritual activities rationally presuppose spiritual substances, even though those substances be invisible and concretely incomprehensible so long as man remains in this world; in both of the foregoing cases it is the same as with natural activities or motions, which presuppose natural substances or matters which act or move.

The principle is stated in *Animal Kingdom*, n. 548: "Wherever there is force and modification, there also is a substance; in short, wherever there are accidents, there also are subjects: the one thing follows from the other, as something from something." *e. g.*, "Wherever there is a sense, there also is a sensorium."

According to *Arcana Cælestia*, n. 4224, substances or "Organic forms are not only those that appear to the eye, and that can be detected by microscopes; but there are also organic forms still purer, which can never be discovered by any eye, whether naked or assisted. The latter forms are interior, as are those of internal sight, and which are in fine those of the understanding. These are inscrutable, but still they are forms, that is, substances; for no sight, not even the intellectual, can exist, except from something." This is also known in the learned world, that is to say, that without substance, which is a subject, there is not any mode, or any modification, or any

quality which manifests itself actively. (Comp. A. C. 7408.)

4. Every degree of activity therefore supposes a corresponding degree of substance which is the subject of the activity. In other words there is a complete series of activities with degrees, order, and form corresponding to the complete series of substances with its degrees, its order, and its forms.

This principle in its relation to the microcosm is expressed in the Treatise on *Action*, as follows: "The actions of the animal body constitute an entire series, order, and form. They may be classed under superior universal, and inferior universal, or as general, specific, and individual. One is under another, and one is in another, just as is the case with substances; for action proceeds from substances as its instrumental causes." (Ch. VII.)

In *Arcana Cælestia*, n. 6465, it is stated, that "It is to be known that all things, not only with man, but in universal nature, exist by means of successive formations [which are substances], thus posterior by means of prior formations. Thence it is, that each formation exists separate from another, but still that the posterior depends on the prior, so that it could not subsist without the prior, for the posterior is held in its connection and in its form by the prior; whence also it appears, that in the posterior are all prior things in their order; the case is similar with modes and forces [which are activities], which proceed from those formations as substances." That is to say the activities correspond in their degrees, their order, and their form to the substances themselves. (Comp. D. L. W. 3160.)

In the *Worship and Love of God*, n. 93, Swedenborg speaks of this principle as a supreme one, showing that forms, which are substances, by their activities or changes of state perform their wonderful functions when mutually subordinate to one another. Then after summing up the order of the substances he states, "Such now is the ascent and descent of forms or substances in the greatest, and in the least universe; similar also is the ascent and descent of all forces and powers which flow from them."

FORM.

The principles relating to form correspond to those which have been presented in relation to activity. They are as follows:

1. Form cannot exist nor can it be thought of apart from substance, or apart from that thing or *esse* which has form, and which in a philosophical sense is called matter.

This is what Swedenborg means in his *Ontology* when he says, that "in corporeal things, form without matter is an *ens rationis*, or an idea which does not really exist. Hence, by some, all that is called matter, by which form is determined, so that where form is, there is matter; for the existence of form must be drawn from matter." . . . "All that is matter, from which is form. But what is material as opposed to the spiritual is another thing." Swedenborg does not here refer to matter in the latter sense. (n. 6.) "Matter, understood philosophically," he says, "may be attributed even to spiritual forms." . . . "The soul is not material. . . . But it does not cease to be matter, that is, the beginning out of which is the form [body], nor does it cease to exist and subsist from its matter or beginning; since it is a form, and form without matter is a non-entity, a thing undetermined and, still more, undeterminable. But we must not conceive of that matter, according to the common acceptance of the term and in a grossly physical sense, as being material." (n. 48.) "No form can ever exist, without matter out of which, just as there can be no sensation without a subject; for matter is the subject itself which is determined." (n. 47.) "If from form you take away matter nothing remains, and substance falls to nothing." (n. 45.)

2. Form regarded in itself is not substance, it is only one aspect of substance, the other being matter in the sense already spoken of. Matter in this sense is never spoken of as form, but a substance may be called a form, for the simple reason that no substance exists that has not its proper form, which characterizes it and distinguishes it from other substances.

The term substance is here used in two very distinct senses. It is used in the sense of the matter out of which form arises or the *esse* of the thing. This is its more abstract sense. It is also used in the more concrete sense of the matter as formed, or the *existere* of the thing. In this sense a substance not only has a form, it also is a form. In this sense substances and forms are used as alternative expressions for the same things. In the first sense substance and form may be said to be distinctly one, just as *esse* and *existere* are said to be distinctly one in God-Man. (D. L. W. 14.) In the second sense substances and forms are used as identical terms. In the first sense God is said to be Substance Itself and Form Itself, or Esse Itself and Existere Itself. It is explained "That these two are one in such a way that they may be distinguished in thought but not in operation, and because they may be distinguished in thought though not in operation, it is said that they are distinctly one." (*ib.*) In the second sense we speak of substantial forms, or of substantial forms simply as forms or substances, or as "forms, which are actual substances." (W. L. G., n. 93.)

3. It follows that without substance, matter or *esse*, as its subject there is no such thing as form, and that therefore every form presupposes substance, or matter. Thus that Divine form presupposes Divine substance; spiritual form presupposes spiritual substance; as natural form presupposes natural substance and material form presupposes material substance.

In the following citations from Swedenborg's *Ontology* the use of the term matter, as already explained, must not be confused with the idea of material matter or substance. Swedenborg says: "The *esse* of form in the universal sense is matter." (n. 77.) That "all that is matter, from which is form." "That where form is, there is matter; for the existence of form must be drawn from matter." (n. 6.) That "matter, understood philosophically, may be attributed even to spiritual forms. For matter is that out of which form is, whether you call it substance or element. No form can ever exist, without mat-

ter out of which, just as there can be no sensation without a subject; for matter is the subject which is determined." (n. 47.) And again, that "That is called matter, which is determined that there may be form, or, from which is form. For without matter there can be no determinations, and hence no form." "So that if from form you take away matter, nothing remains, and substance falls to nothing." (n. 45.) "Matter, therefore, considered philosophically, is not taken to be heavy, inert, or corporeal, but it is taken as [*esse* or] the beginning of existence, and as that without which there is no determination and no form; for that something which is determined is called matter."

4. Since every form presupposes a corresponding substance subject to that form, there are therefore series and degrees, and an order of forms corresponding to the series, degrees, and order of substances and activities.

As stated in *Divine Love and Wisdom*, n. 200, "All perfections increase and ascend along with degrees and according to them, because all predicates follow their subjects and perfection and imperfection are general predicates; for they are predicated of life, of forces, [or activities], and of forms." . . . "Perfection of forms and perfection of forces make one, for as the forces are, such are the forms; with the difference only, that forms are substances, but forces are their activities: therefore like degrees of perfection belong to both." (Comp. *ib.*, n. 205.)

SUBSTANCES.

In the light of the foregoing principles it will be possible to understand more clearly what is involved in Swedenborg's definitions of substance, several of which I will quote:

In *Economy of the Animal Kingdom*, n. 619, it is stated "that matter joined to form, is substance." This definition coincides with the statement quoted from the *Ontology* "that if from form you take away matter, nothing remains, and substance falls to nothing." Substance is here defined in contradistinction to its activity, and as involving both the concept of the matter out of which, and also the concept of the form in which it exists.

Compare with this the statement in *True Christian Religion*, n. 20, that "whatever is a substance is also a form; for unless substance is a form, it is an entity of reason." And in *Divine Love and Wisdom*, n. 209, that "By substance is also meant form; for substance without form does not exist." The same idea is expressed in terms of *esse* in n. 15 of the same work. It is stated that "The reason that *esse* is not *esse* unless it exists, is that until then it is not in a form; and if it is not in a form it has no quality; and what has no quality is not anything." (Comp. C. L. 66; W. L. G. 47, note (h).)

A further essential to the complete idea of what substance is, is summed up in the definition of the *Ontology*, n. 34, "That substances be substances, they must be modifiable and able to change their state. Thus they must be endowed with force." "The modifications themselves, which are changes of state or variations of forces, although they [too] are forms, still cannot be called substances, but only the operations of substance."

The activity side of substance appears in the statement in *Worship and Love of God*, n. 47, note (h), that "Whether we speak of forms or substances, it amounts to the same thing, since no substance produced from God is without a form, whence it derives its faculties of acting, and its qualities." As stated in *Divine Love and Wisdom*, "Forms are substances, but forces are their activities." (n. 200.)

Perfection of substances is defined in terms of their activities. As in *Worship and Love of God*, n. 49, note (h): "In proportion as substances are prior and posterior, in the same proportion they are able to vary their forms, or change their states, not only more alertly, but by modes, if I may use the expression, more infinite, so that in the supreme substances there is such a power of varying them, that they exceed all calculation, and all series of calculations; for their very perfection, because their activity, consists in the variability of their form."

The same principle is involved in the teaching of *Arcana Caelestia*, n. 7408, that activities or "modifications receive their form from the forms, which are the substances, in which they

are and from which they flow, inasmuch as substances or forms are determining subjects."

THE CREATE AND UNCREATE.

The distinction between substances (as the matter out of which, and the form), and its activity, is expressed in the Writings as the *create* and the *uncreate*. The principles reviewed give us a basis for understanding what is meant by the create and the uncreate. There is only one substance which is uncreate, namely, the Divine and Infinite substances which is substance itself and form itself, or the Divine *Esse* and Divine *Existere*, all other substances spiritual and natural are create, that is they are created from or proceed from the Divine substance. But no activity can be created or proceed in the same sense, for the simple reason that activity is not a thing or a substance by itself, it has no existence apart from the substance which acts. All activity and all forms of activity are therefore uncreate. Being the activities of substances they can be communicated by contiguity from one substance to another. Such communication by contiguity is called *influx*. But activities cannot be compounded of one another apart from the actual substances, which act and are acted upon.

This is the distinction which is expressed in *True Christian Religion*, n. 472, where it is said, "The following are non-creatable, namely, 1. The Infinite is not; 2. Love and wisdom are not; 3. Hence life is not; 4. Neither light and heat; 5. Yea, neither is activity itself regarded in itself. But the organs [or organic substances] receiving them are creatable, and are created [or create]. This may be illustrated by the following comparisons: Light is not creatable, but its organ which is the eye; sound which is an activity of the atmosphere, is not creatable, but its organ, which is the ear; neither is heat, which is the primary activity, for receiving which all things which are in the three kingdoms of nature were created, which do not act, but are actuated according to reception. . . . The very substance of the sun consists of created substances, the activity of which produces fire."

Of form it is also true that in itself it is non-creatable or non-create. In contradistinction it is said that it formed, but not created. In other words the substance out of which, is created, but the organism is formed. This distinction is implied in the account of creation in Genesis, where things are said to be created and formed.

SUMMARY.

Summing up the fundamental concepts involved in substance, we would gather that, Every substance involves a something real or an *esse*, either Divine, spiritual, or natural, which is organic or organized and therefore has form or *existere*, and which at the same time has its proper activity or *essence* corresponding in form to the organic form of the substance. That therefore the complete idea of substance involves three essential concepts, concepts of three inseparables which actually never exist apart, but are distinctly one.

I have attempted to confine myself, as far as possible, to universal principles which pertain in their own way to all substances, Divine, spiritual, and natural. But it must be borne in mind that although spiritual substances represent the Divine substance in an image, still there is no ratio between them, and thus the actual nature of the Divine substance is incomprehensible even to the highest angels of heaven. In a similar way it must be borne in mind that although the substances of the natural world represent the substances of the spiritual world in an image, still there is no ratio between these either, so that the actual nature of spiritual substances is said to be incomprehensible to man so long as he remains in this world. By virtue of such universal principles, such as we have outlined, however, it is possible for man even in this world to have a rational understanding not only of the general nature of the substances of the spiritual world, but even of the Divine substance itself. At best, though so long as he remains in this world, man can conceive of spiritual substances only somewhat naturally. The most important thing is that he preserve the idea that they are real, that is, substantial, formed, and

active, and at the same time that they are distinct from natural substances or forms, and that they will be actually comprehended as they are in themselves after death.

In this we may be consoled by Swedenborg's own experience, which he relates in the *Arcana Cælestia*, n. 1533, where he says: "Of the innumerable things that appear in the other life, I could scarcely form any other idea than others do, before my sight was opened; as, for instance, that light, and such things as exist from light, as well as sensitive things, could by no means exist in the other life; and this on account of the phantasy entertained by the learned respecting the immateriality, which they predicate so strongly of spirits, and of all things which concern their life; from which no other conception could be had, than that, because it [spirit] is immaterial, it must either be so obscure that no idea of it could ever be grasped, or else it must be nothing; for immateriality involves this. Yet nevertheless the fact is altogether the reverse; for unless spirits were organic, and angels organic substances, they could neither speak, nor see, nor think."

Note that the difficulty which Swedenborg here refers to is shown to have arisen from abstracting the activities from their spiritual substances, or from the spiritual matter which is active, and attempting to conceive of them as immaterial. The possibility of doing this and the result of so doing is what was referred to in *Divine Love and Wisdom*, n. 210, where it is stated, that "From its being possible to think of will and understanding, of affection and thought, and of charity and faith, abstractly from the substances which are their subjects, and from their having been so thought of, it has come to pass, that a correct idea of these things, as being states of substances and forms, has perished." . . . "Abstracted, that is, separated from these, they are mere figments of reason." (Comp. S. D. 2366-2369.)

In conclusion and by way of illustration of the principles presented, I will now briefly summarize some of Swedenborg's definitions of spiritual or psychological phenomena, especially those given after his spiritual eyes were opened, and he saw the things in the spiritual world actually and clearly.

In the first place it is said that "all the operations of the mind are variations of [its] form, which variations in the purer substances are in such perfection as cannot be described; and that the ideas of thought are nothing else; and that these variations exist in accordance with the changes of state of affections," (A. C. 6326), or with those changes of state which are shown elsewhere to be affections. (Comp. D. L. W. 41-42; 273.)

"The human mind is organized inwardly of spiritual substances, and outwardly of natural substances, and lastly of material substances." The human body is also organized throughout, and distinguished by successive formations. "That similar formations are affected in the human mind is evident, because there is a perpetual correspondence of all things of the mind with all things of the body." (T. C. R. 38.)

This organization of the human mind is further described in *Divine Love and Wisdom*, where it is explained that it is "the natural mind [which] derives its form in part from substances of the natural world; but the spiritual mind from the substances of the spiritual world only." (n. 270.) And that although "Man's natural mind consists of spiritual substances; and at the same time from natural substances; thought arises from its spiritual substances, but not from its natural substances; these natural substances recede when man dies, but not the spiritual substances." (n. 257.) These natural substances I understand to include all that pertains to the composition of the brain, and of its animal spirits, the most subtle portion of which, far removed from the view of the microscope, constitutes the natural limbus which is said to be retained.

Such is the nature of the human mind as an organism and a faculty. It is a faculty in that like the body it is able to undergo changes of state, or operate, or in that it is subject to various forms of spiritual activity. As such an organism it is essentially will and understanding, the will and understanding being spiritually organic faculties capable of undergoing those spiritual activities, or operations, or changes of state

and form, which are called willing and understanding in the sense of mental activities.

The opening of the mind and of its organic faculties is no more nor no less than their being initiated into their proper activities, and their development and perfection consists in the right co-ordination of these activities and of the substances themselves in agreement with Divine order.

The various forms of activity which the mind so organized undergoes, and also the resulting states induced upon the mind, are very clearly defined in the Writings.

It is said in *Divine Providence*, n. 279, that "affections, which are of the will, are mere changes of state of the purely organic substances of the mind; and that thoughts, which are of the understanding, are mere changes and variations of the form of those substances; and that memory is the permanent state of those changes and variations." (Comp. A. C. 444, 2487, 5518; H. H. 454.)

In the *Arcana Cælestia*, n. 5726, it is said, "They who have no other idea of knowledges, and also of truths, than that they are abstract things—such an idea as most people have concerning thoughts—can in nowise apprehend what is meant by good being implanted in knowledges, and by truth being the recipient of good. But it is to be known that knowledges and truths are things no more abstracted from the most pure substances of the interior of man, or of his spirit, than sight is abstracted from its organ the eye, or than hearing is abstracted from its organ the ear. There are purer substances, which are real, from which they exist, the variations of the form of which, animated and modified by the influx of life from the Lord, present them to view; and their successive—or simultaneous agreements and harmonies, are what affect, and make, that which is called beautiful, pleasant, and delightful."

"In its essence love is the harmony resulting from the changes of state and the variations in the forms or substances of which the human mind consists; if that harmonic be of heavenly form, the love is heavenly." (A. C. 5807.)

The concepts good and true as qualities likewise refer to the

order, or to the state and form of organic substances. For this reason goods and truths are often spoken of as the substances themselves which are in that state and form. just as substances are spoken of as forms. But to be affected by a good is the result of an activity of the mind, and to think or perceive a truth is also the result of an activity or a variation of the form of the organic substances of the mind. In this sense goods and truths are spoken of as not being substances, but operations or activities of the substances. Thus it is said in *Divine Providence*, n. 195, "Indeed goods and truths are changes and variations of the state of the forms of the mind."

Love and wisdom for the same reason are sometimes spoken of as substances, and again it is definitely state that they are not substances. Two very distinct things are as we see referred to, and the principles which have been outlined completely harmonize the meanings involved.

From all that has been said it is manifest that life is activity—the activity of substance. All the psychological operations which have been enumerated, and all others whose description we pass by, are the spiritual life activities of spiritual substances. The Divine life itself, is the Divine activity of the Infinite substance of God. Spiritual life is the activity of spiritual substances. And natural life is the activity, or simply the motion, of natural substances. The Divine substance alone acts of itself, in a supreme sense it alone is said to be living. All finite substances, spiritual as well as natural, are said to have been created from the Divine substance itself in a marvellous way, by the withdrawal of His Divine activity or life. Therefore no finite substance, spiritual or natural, has activity or life of itself; its activity is communicated from without, from other substances by means of their activities perchance, but ultimately from the infinite activity of the Divine substance, which is life itself.

The communication of activity from one substance to another, or from a higher degree of substance to a lower, is called influx, and the reverse types of communication, efflux. In spiritual substances this communication of activity, and its

transformations, correspond to the physical transformations of energy in nature.

Indeed, all the psychological phenomena which have been explained, have their correspondents in nature. Spiritual substance corresponds to natural substance; spiritual form to natural form; spiritual activity to natural activity, or motion. Love and wisdom correspond to heat and light, and so on throughout. It is by reason of this correspondence, we are told, that it is possible for us to comprehend rationally the nature of the spiritual world, and of its phenomena, even though our spiritual eyes are closed, and therewith the ability to see spiritual things as they actually are in themselves, so long as we remain in this world.

I have presented this study with the hope that it may help to throw some light on many of the abstruse philosophical problems with which we are confronted, and with a feeling for the importance of formulating an ontology, and thereby an educational psychology, in accordance with revealed principles. My interpretations may be wrong. If so I rely on your frank criticism to assist in righting them.

SWEDENBORG'S SCIENCE AND ITS RELATION TO THE SCIENCE OF TODAY.

BY PROFESSOR FRANK VERY.

Those who have never studied Swedenborg's Science, or who, having attempted its study, have been repelled by the intricacy of some of his ideas, or by unfamiliarity with his language and consequent doubt as to its precise meaning, may have difficulty in conceiving that there can be any use in going back nearly two centuries to read works which must seem to them to be the antiquated relics of a bygone age, completely left behind in the wonderful Scientific progress of the last Century. But if there be such persons, they must be prepared to learn that there are exceptions to all rules, and Swedenborg is one of them. For while other scientific theories of that distant time have been largely laid on the shelf, some of

his ideas are just beginning to come to their own, and are receiving unexpected confirmation, either as a whole, or in part.

It is surprising how "*modern*" some of Swedenborg's theories are. The idea of an atom is as old as Democritus, but this was supposed to be the limit of the possible division of matter. Swedenborg, on the contrary, asserted that there were particles having different orders of magnitude, and that these were moving with great rapidity inside the aforesaid particles which previously had been thought of as somehow solid, as well as infinitely resistant and indivisible. Thus he taught that a particle of the element, air, might consist of 10,000 or 100,000 moving particles of a finer order, and these in turn of as many particles of a still finer order. Everywhere he saw motion and energy. The first part of this proposition is completely verified today. We now know that the atom is composed of many thousands of electrons, and that these are in extremely rapid orbital motion within the atom; and it is a safe guess that the electron will be shown to be formed of still finer moving particles. Already certain electrical properties are known which can best be explained on this hypothesis.

Swedenborg limited this sequence of particles to three orders, this being indicated by his great philosophic principle that throughout nature,—and as he afterwards found, in the spiritual world as well,—all things exist in trinal systems of successive derivation. The confirmation of this idea by facts known to him and by multitudes of others which have been discovered and firmly established in recent times, is simply marvelous.

Take such a simple thing as the skin or covering of a seed. It is best studied in its earliest stages in the ovule, where it consists of an outer coat, or primine; a middle coat, or secundine; and an inner coat, or tercine; the triple coat opening by a pore at the summit, called the micropyle, through which the fertilizing pollen-tube enters to communicate its virtues to the embryo which floats in the embryonic sack. The latter is the germ of the seed itself, protected by its triple coat. Sometimes one of these three coats may be wanting, or represented

by a rudiment, but never are there more than three. Spiritually, three represent what is complete—in the case of the triple seed-coat, complete protection of the vital embryo.

Again, taking a cross-section of a small nerve, we find an outer sheath of perineurium, which is rather apt to consist of three layers of connective tissue, within which float on a bed of soft lymph about a dozen or twenty bundles of medullated nerve fiber, each bundle separated from the others by subordinate sheaths of connective tissue. A bundle consists of a dozen or twenty medullated nerve-fibers in the given example, each fiber composed of a medullary sheath and an axis-cylinder, or tiny little tube filled with the nerve-fluid whose rapidly transiting chemical transformation constitutes the nerve-current, conveying to the central station in the brain an impetus which gives sensation to the inmost sentient cells, or in the reverse passage transmits the messages of control to the muscles or other organs. Here, again, we find a three-fold structure, but it is constitutional, and not simply protective. There is here a fundamental triple structure, consisting of (1) the nerve, (2) the bundles, and (3) the medullated fibers.

To Swedenborg we owe the conception that there is a trine in the blood; three kinds, or successive degrees of the vital fluid in the body; namely, the red blood, the lymph, and the animal spirit, or nerve-fluid; together with their three systems of vessels—the blood vessels, or circulatory system of arteries and veins, the lymphatics, and the medullated nerve-fibers. To-day may we not only see a further trine in the red blood itself? I think we may say that these three systems have their messengers, or representatives in the lowest degree of the blood, which is a complex of all three, in that the special messenger of the red blood is the blood disk with its hemoglobin carrying oxygen to all parts of the body. Besides the red disks there are the leucocytes, the purifiers of the blood, which are the representatives of the lymphatic system, and the blood plagues which are the direct representatives of the brain, the vitalizers of the blood, full of energy and motion, almost, as it were, free brain cells.

These things of the body are described at greater length in Swedenborg's anatomical writings, but are found summed up in *D. L. W.*, n. 190. This passage illustrates how necessary it is for students of spiritual philosophy to have a knowledge of natural science. Without a clear picture of the triple structures of their several sorts, the reader remains in mere abstractions which have no basis in reality.

It was because Swedenborg was continually striving to apply his knowledge practically, that he was led into discoveries and inventions, either accomplished, or carefully thought out. Among these we find the design and actual construction of the first ship-railway; the invention and construction of the first mercury vacuum-pump; plans for a submarine boat and a flying machine which bring his active thought right down to the present time and the late war. These were defective because there was then no known way of constructing a motor of sufficient power to run them, but otherwise showed a general knowledge of principles and uncommon fertility of inventive genius. As a metallurgist, he publishes large treatises on the metallurgy of iron and copper, the first of their kind, and thus lays the foundation of Swedenborg's greatness in these arts.

In the domain of cosmical and physical conceptions, at a time when everybody believed that the world was instantaneously spoken into existence by divine fiat a few thousand years ago, Swedenborg declares that the Earth and planets have been thrown off from the sun by centrifugal force, that they have gradually moved outward along progressively widening spiral paths to their present positions, a view which is much to be preferred to Laplace's suggestion that the sun contracted and left the planets behind. In addition to this he foresees an evolution, or development of the Earth through successive states beginning with an age of fire and continuing through various stages of cooling to an equable and mild climate favorable for plant and animal creations. He discovers the bones of a whale at a considerable height above sea level, and argues that the Sea must have formerly been at this height, though

he surmises that this may have been due to the higher tides in the earlier ages, which was a bad guess. The tides were, indeed, higher in the *very* early ages, because the Moon was then nearer to the Earth; but that was long before any known geologic records, and the elevation of marine beds is to be ascribed to the bending and upheaval of the Earth's crust.

A most notable achievement was the imagination of a system of atmospheres with constituent vortex-particles whose motions are the source of various physical forces. Though some of the details, especially those concerning terrestrial magnetism, are now known to be erroneous, the general scheme has proved to be extraordinarily near the truth. Though certain details require modification to adapt them to recent discoveries, much of the theory can be shown to be in agreement with facts only recently determined, notably the theory of light given in the *Principia*, the theory that there are innumerable stellar galaxies scattered through space, that our Galaxy is magnetically controlled, etc. Some of these conjectures are so vaguely stated that one hesitates to identify them with modern ideas, but they are very suggestive and certainly are not far from the truth.

Finally, Swedenborg's anatomical researches, his discovery of the expansion and contraction of the brain, and the localization of certain functions in particular cerebral convolutions, his explanations of diverse physiological processes, novel even to-day, or at any rate until very recent times—all these features make the study of Swedenborg's science valuable for the elucidation of present-day science and indispensable for the explanation of some of his spiritual doctrines. Thus he is the first to note that there is a superspace in the spiritual world, and the first to connect the laws of that superspace with what we now call the "fourth dimension." He first recognizes that there is an influx into nature from the Spiritual world and announces that sustentation is perpetual creation; and it is shown to him that creation is instantaneous in the spiritual world, but is continued through generation in nature.

Are we then to regard Swedenborg's scientific writings as

a final system of natural truth? Certainly not. Natural science is never final. Science must always be free to grow and to improve. New discoveries are continually being made in science. Previous announcements of scientific theory have to be modified and enlarged to include the new facts, and this change must go on perpetually. It is one of the signs that science is a live thing. Science is the great expositor of the New Age, and eagerly accepts the message of the Lord: "Behold, I make all things new." That is its charter of progress. Swedenborg himself was fully imbued with the scientific spirit. In the *Principia* he says, "Truth is my single end and aim; and if any friend will educe from his treasury of science a more just and true representation of the subjects in hand, his kindness in so doing will be esteemed a most acceptable service."

Consequently, it would not be useful to study Swedenborg's science without, at the same time, comparing it with the re-statements and extensions of the present time. The result of my critical examination of the *Principia* was that "As a single consistent theory of creation, the '*Principia*' is not entirely successful. Its value is rather as an example of high thinking and as a mine of useful suggestions. Moreover, as Swedenborg learned later, creation is from the spiritual sun and can not be comprehended from merely natural experience. Nor are the laws of nature to be found by deductive reasoning, for the palimpsest of nature has many erasures."

What, then, is the chief end in our study of Swedenborg's science? I think it should be to become imbued with his spirit and method; to get his point of view which rejects neither the Baconian nor the Aristotelian method, but unites them in a combined attack on the unknown from within and from without. "At this day we are made wise only by means of experience," he says. But "he who has knowledge, and is merely skilled in experiment, has taken only the first step to wisdom; for he only knows what is posterior, and is ignorant of what is prior; thus his wisdom does not extend beyond the organs of the senses, and is unconnected with reason. He who desires to be wise is wise from both." (*Principia*.)

Great deeds can be accomplished under the leadership of this many-sided man. Let us try to acquire the art from him.

I will end with a quotation from my paper on Swedenborg's *Principia*:

"Swedenborg's method has been called peculiar. It is, indeed, a new departure in science; but the method originated in a greater than Swedenborg. 'Seek ye first the kingdom of God . . . and all these things shall be added unto you,' says the voice of Jesus. It was new in science to begin with the acknowledgment of God, and from this as a center to deduce the principles of natural science. Henceforth religion and science are to be one. The conflict of the ages is ended."

FRANK W. VERY.

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April 2d, 1919.

THE BRAIN.

BY EMANUEL SWEDENBORG. (*Continued.*)

III. [THE VESSELS OF THE CEREBRUM.]

Inasmuch as the pia meninx and its arteries and veins and those of the whole cerebrum will be treated of in the following Transaction, we shall here describe only such vessels as have already entered the cerebrum and there run in the cortical and medullary substance.

99.† Nothing is known to happen more frequently than that the blood in the points and little channels enclosed in the brains comes out in drops around the finger, or the point of the instrument, that effects the opening; this is also affirmed by

†The whole of the paragraph is crossed out by the author, indicating perhaps that it has been copied elsewhere. Compare the author's second work on the Brain, 5 *Phot.*

MSS., p. 98, and 1 *Brain*, pp. 327, 328.

*The autograph has *supernas valvas* (upper valves) but Vieussens' words are *supernam pariem* as translated in the text.

Morgagni. That the structure of both viscera is varied by so many sanguineous drops that it appears as though dotted with stars. is evident from an inspection of Vieussens' plates vi, vii, xii, and xiii; and from his plate vii where the cerebellum is shown as having the like appearance. It is also evident from Ridley's figure 5, where, in addition to the infinitude of ruddy stars of this kind shown in the lateral and superior part of the hemispheres bordering on the fornix, arteries are seen flowing within the cortical and medullary substance, in their own proper form as elsewhere in the body. Vieussens has observed that more arteries of this kind, and also grosser, are found in the lower part of the medulla than in the upper; and that this substance is traversed by them all the way to the cineritious substance of the striate bodies. Again he says: "No such arteries, or very few, are observed in the parts of the grosser meninx situated near the sinuses or immediately under the cortex; only a few in the fornix; not many in the medullary substance of the posterior borders of the cerebrum [nor in that] which constitutes the upper part* of the anterior ventricles of the cerebrum; few in the whole external surface of the medullary substance of the cerebrum and cerebellum immediately subjacent to the cortex; but many in the parts more remote therefrom, as in that which constitutes the walls of the anterior ventricles, and in that which immediately embraces the medulla oblongata. . . . If spirits of wine colored with saffron be repeatedly injected into one or other of the carotids after both have been ligated near the middle of the neck, the cineritious substance of the cerebrum, and also many of the vessels running through the medullary substance, are imbued with the saffron color. Thus it is evident that the blood is carried to the cineritious substance" (*Neurographia, Lib. 1, De Cerebro, cap vi*). According to Willis, when a black colored liquor is injected into the carotid, even through a single opening, and the injection repeated several times, the vessels creeping through every corner of the cerebrum and cerebellum are imbued with the same color (*Cerebri Anat. cap. vii*).

(To be continued.)

THE NEW PHILOSOPHY

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NOTES BY THE EDITOR.

Owing to the lateness in their appearance, we issue the last number of volume XXII and the first number of volume XXIII under one cover.

We call special attention to the announcement on our cover page, of the impending publication of Swedenborg's PSYCHOLOGICAL TRACTS. This work includes the eight small works published by the SWEDENBORG ASSOCIATION in 1847 under the title "Posthumous Tracts,"—a work which has been for many years out of print. But in addition to the contents of the "Posthumous Tracts" the present volume, more descriptively called "Psychological Tracts," includes an hitherto unpublished fragment, "Faith in Christ;" and, at the end of the volume, a new translation of the HIEROGLYPHIC KEY, and the first appearance of Swedenborg's DOCTRINE OF REPRESENTATIONS AND CORRESPONDENCES, which is undoubtedly a continuation of the Hieroglyphic Key.

We would also invite the attention of our readers to the new CLASSIFIED LIST of Swedenborg's earlier works, which is advertised on the same page as the Psychological Tracts. The classification of Swedenborg's works into Literature, Art, Poetry; Politics and Economics; Mechanical and Physical Sciences; Mineralogy and Chemistry; Mathematics; Cosmology and Astronomy; Physiology; Philosophy; Psychology and Theology; gives the reader an opportunity, not only of seeing what works were written by Swedenborg, but also of envisaging the great variety of his literary activities.

On another page we print some corrections of Mr. Clissold's translation of the *PRINCIPIA*, which have been noted by the painstaking research of Mr. Ernest Pfeifer. As Mr. Pfeifer observes, these corrections are of some importance and, for the most part, introduce a wholly different and sometimes even an opposite meaning into the text. It will probably be long before we have any translation of the *PRINCIPIA* superior to Mr. Clissold's, and we would therefore suggest that owners of his translation enter these corrections in their copies.

In this issue we print a summary of the Minutes of the Swedenborg Committee appointed by the ROYAL SWEDISH ACADEMY OF SCIENCES in 1902 for the purpose of investigating the Swedenborg manuscripts preserved in the Academy's Library, with a view to their publication. The result of the work of this Committee was the publication of volumes I to III of the *OPERA QUÆDAM*,—an edition of Swedenborg in the original which has never been equalled. No new volumes have been published since 1911, though, as will be seen from the Minutes, the plan drawn up by the Committee contemplated the publication of twelve volumes; a portion of volume IV moreover has already been long in print.

Mr. Stroh's illness was the immediate cause for the temporary discontinuance of the work; and then came the great war. The present prospect for the completion of this series is somewhat uncertain, but in view of the fact that the ROYAL ACADEMY has a fund of over \$1,000 for the special purpose of this publication, it should be possible to resume the work in the near future. A large number of subscribers could, without doubt, be readily obtained, if only some definite announcement were made as to the work to be published, and the proximate date of publication.

The thought of the Royal Swedish Academy's noble edition of the *OPERA QUÆDAM* brings vividly to mind the obligations under which students of Swedenborg lie to the late

PROFESSOR GUSTAF RETZIUS. It was owing to PROFESSOR RETZIUS' initiation and enthusiasm that the work, so happily commenced by the ROYAL ACADEMY, was first originated; and it was his great generosity that defrayed the cost of the three volumes that were published.

PROFESSOR RETZIUS was elected to Honorary Membership in the SWEDENBORG SCIENTIFIC ASSOCIATION, being the only man who has thus far been so honoured. Like his father before him, PROFESSOR RETZIUS was one of the greatest students of cerebrology that Sweden has produced, and it was his keen interest in this subject and his profound knowledge of its details, that first attracted his special interest in Swedenborg and then secured his never failing admiration for the philosopher's physiological writings, especially those on the brain.

PROFESSOR RETZIUS passed away at Stockholm on July 31st last, in the seventy-eighth year of his life, leaving behind him an honored name, whose fame his life's work has only enhanced.

To students of Swedenborg's philosophy, the publication of the records of that SWEDENBORG COMMITTEE on which he so actively served, will be a permanent testimonial to the debt which they owe to his enlightened discernment, and liberal generosity.

BOOKS RECEIVED.

BOETHIUS, THE THEOLOGICAL TRACTATES AND THE CONSOLATION OF PHILOSOPHY. New York: Putnam's. pp. 430. \$2.25. This edition contains the Latin Text with an opposite page of English translation,—the latter being especially commendable for its fidelity to the Latin. The Theological Tractates are a defence of the Doctrine of a trinity of Persons, in a style characteristic of the scholastic Theologian. Such arguments would rarely be heard now-a-days,—but the doctrines

themselves remain unchanged. Very different from the *Tractates* is "The Consolation of Philosophy," a work which might well raise a doubt as to its authorship, and even as to whether its author was a Christian. Its spirit is that of the Roman Philosopher, not of the dogmatic theologian. It is a dialogue full of noble thoughts.

THE COMING OF THE LORD, WILL IT BE PREMILLENIAL? By James H. Snowden, D. D., LL. D. New York: Mac-Millan. pp. 279. \$1.50. A work of interest solely to the Premillenarians, who believe Christ will appear before the Last Day, and the Postmillenarians, who believe He will appear after the Last Day. The writer seems to have never a doubt as to the literal fulfilment of the Scriptures with respect to the Last Day itself.

THE AUTONOMIC FUNCTIONS AND THE PERSONALITY. By Edward J. Kempf, New York and Washington, Nervous and Mental Disease Pub. Co. pp. 150. \$2.00. A work designed to show that the human mind, as well as the human body, is a pure piece of mechanism, for the explanation of whose phenomena the soul is not required. Indeed, the author would banish the term Psychology from his lexicon, yet the term itself creeps in quite frequently.

AUTOBIOGRAPHY OF AN ANDROGYNE, New York, The Medico-Legal Journal. pp. 265. This book is an autobiography by a man who from his earliest years has experienced almost altogether the disposition and nature of a woman. The author shows himself in anything but a favourable light; and yet no doubt can be left in the mind of the reader as to the fundamental facts of the problems which his life constitutes. What shall we say as to natures such as these? Is it possible that, as there can be a mixture and amalgamation of two individual bodies on the physical plane—as witness the Siamese

twins, etc.—so there may be something analogous on a plane of more interior nature?

The author contends that the number of abnormal people such as he, is quite large, and his book is written mainly with the intention of relieving their lot from a social and legal point of view. The sale is strictly confined to physicians, lawyers, psychologists and sociologists.

TEN YEARS NEAR THE GERMAN FRONTIER. By Maurice Francis Egan, former U. S. Minister to Denmark. New York. George H. Doran Co. pp. 364. \$2.00. Denmark has been called the "listening gallery of Europe" and this description is strikingly illustrated by Minister Egan's charming and wholly informing work, in which one learns of political movements immediately prior to the war, and which throw new light upon the war itself.

WHAT IS THIS SPIRITUALISM? By Horace Leaf. New York. George H. Doran Company. pp. 185. \$1.50.

DEATH, THE GATE OF LIFE. By H. A. Dallas. New York. E. P. Dutton & Company. pp. 148.

In the first of these works the author presents the case for spiritualism in a clear, orderly, and most entertaining way; spiritualism is presented in so favorable a light, that the reader will inevitably be led to expect treasures from the psychic experiences, which Mr. Leaf so ably defends. In "Death, the Gate of Life" we have before us the actual results of these psychic experiences. Mr. Dallas undertakes to do little more than present simply and exactly, albeit in abbreviated form, the actual fruits of intercourse with spirits; but despite the presenter's enthusiasm, how sad, how disappointing the picture! Indeed, the reader can hardly but wonder at the state of mental life that must exist among spirits, if the trivialities and nonentities that come to us, as is purported, as messages from the dead, are to be taken as indicating the quality of that life. There is at present a wide-spread movement to prove the existence of the spiritual world by psychic

phenomena scientifically demonstrated. Those who favor this movement do not appear to reflect that a belief in the spiritual world thus founded on preternatural experiences, would require the continual repetition of the experiences for its maintenance; and even supposing this possible and feasible, what, even then, would be the contribution to the world's store of real intelligence and wisdom. Some of the present champions of spiritism themselves illustrate the answer, for, though they are acquainted with Swedenborg and acknowledge him as one of the greatest of the "Psychics," yet they display not the slightest interest in the psychological and spiritual truths that he reveals; nor any credence in the claim that he makes, beyond the mere fact that he actually spoke with spirits.

SUMMARY OF MINUTES

OF

MEETINGS OF THE SWEDENBORG COMMITTEE ,

APPOINTED BY

THE ROYAL SWEDISH ACADEMY OF SCIENCES.*

The Committee was appointed by the ROYAL SWEDISH ACADEMY OF SCIENCES on December 11th, 1902, with instructions to determine the extent to which the Swedenborg manuscripts found in the Academy's Library should be printed.

The Committee held its first meeting on February 14th, 1903, in the Academy Library. All the Members were present, as follows:—Messrs. Loven, Retzius, Nathorst, Henschen and Arrhenius; and also Mr. A. H. Ströh, who had promised to assist the Committee with information.

*The original Swedish of these Minutes is printed in Vol. I The Swedenborg Archives, p. 104-119. The summary is made from a

manuscript translation by Alfred H. Ströh, which was too long to print in full.

1. Mr. Retzius was chosen President.

2. It was decided to apportion the examination of Swedenborg's literary remains among the Members of the Committee. Mr. Arrhenius undertook the writings on physics and chemistry, etc. To Mr. Nathorst were given the writings on geology, paleontology and botany. Messrs. Loven, Henschen and Retzius received the commission to examine the anatomical and physiological writings.

3. To further the work, the Committee considered the question of copying the more important manuscripts.† Mr. Stroh stated that he had a copy of one of the manuscripts on physics, and that in America there was a copy of a still unpublished manuscript on the Brain.

Further action was deferred pending enquiry in America.

GUSTAV RETZIUS.

MINUTES OF MEETING HELD ON APRIL 4TH, 1903.

Present: Messrs. Retzius, Nathorst and Arrhenius, together with Mr. Stroh, who assisted the Committee.

1. The minutes of the preceding meeting were approved.

2. Mr. Loven was unable to be present owing to illness and Mr. Henschen was away on a foreign journey.

3. It was reported that the Board for the Lars Hierta's Memory had appropriated Kr. 700 for the copying of Swedenborg's manuscripts. This money had been placed at the Committee's disposal.

4. Mr. Stroh informed the Committee that he had heard from America that the manuscript copy on the Brain would be sent to Sweden for the use of the Committee.

5. The Committee decided on the copying of a manuscript index to Swedenborg's works, written by Swedenborg himself. Also a copy of other smaller works. (See note, p. 437.)

6. The Committee decided to propose to the ACADEMY, to first publish the manuscript on physical subjects, mentioned in No. 3 of the minutes of February 14th and which had been placed at the Committee's disposal by Mr. Stroh. It would

†See note on page 437.

occupy from ten to twelve sheets. Mr. Retzius assumed responsibility for the cost of printing the first volume. Mr. Arrhenius undertook to examine the proofs and to supply the necessary notes. Mr. Stroh offered to assist in the examination of the proofs and to collate them with the manuscript. The Committee considered it proper that this work be furnished with a general Latin title, indicating that the Series consisted of selected works by Swedenborg, partly unprinted, partly out of print; and also that the Series should appear under the auspices of the SWEDISH ACADEMY OF SCIENCES.

GUSTAV RETZIUS.

MINUTES OF A MEETING HELD ON OCTOBER 3RD, 1906.

Present:—Messrs. Nahorst, Henschen, Arrhenius, Retzius; also Mr. A. H. Stroh.

1. It was reported that since the previous meeting Professor Chr. Loven had died.
2. The minutes of meeting of April 4th, were approved.
3. The President, Professor Retzius, explained that he had not called any meeting earlier because since the last meeting the only work involved concerned the carrying out of the decisions already made, and the Members of the Committee had been able to discuss the questions concerned among themselves. The printing had been going on slowly, partly because of the difficulty of procuring copies and partly because, during recent years, Mr. Stroh, who most directly superintended the reading of proofs, had lived in America and the proofs had, therefore, to go to America and back. The chief thing, however, was to have the work well done, and since there was no special hurry there had been no endeavor to push the printing; but in July, of the present year, Mr. Stroh had arrived in Stockholm with the intention of staying here during the next year and he had declared himself willing to use a considerable part of his time for the completion of the publication of Swedenborg's writings; it would, therefore, be desirable that this should proceed without interruption. It had become manifest, for several reasons, that it was necessary to divide

the writings on geological, chemical and cosmological subjects into three separate volumes. The printing of these volumes, comprising about 75 sheets, was now well advanced. For the first volume (geological writings) Professor Nathorst had written an introduction which was now in print in Swedish under the proceedings of the Geological Society and was being translated into English by Mr. Stroh. For volume II (on chemical subjects) an introduction was still needed and Mr. Retzius suggested that Mr. Arrhenius be so kind as to write one. For volume III (on cosmology) Mr. Arrhenius had already kindly written an introduction, which was now being worked up. Mr. Retzius expressed the Committee's warm thanks to Messrs. Nathorst and Arrhenius for their work on these introductions, by which the knowledge of Swedenborg's views and discoveries in the fields in question had been so materially advanced. After these three volumes had been printed there still remained the writings on Anatomy and Physiology, especially those on the Brain and nervous system. Several works by Swedenborg on these subjects had already been printed, but were now extremely scarce, and besides there were also other manuscripts from various periods of Swedenborg's life. Copies of the more important of these had been taken at the Committee's expense and a copy of a large manuscript on the brain had been received as a loan from Urbana for the purpose of eventual printing. The three volumes on Anatomy and Physiology would run to approximately 100 sheets. Mr. Retzius had thought that it would be necessary to wait some time before the publication of these volumes, but since Mr. Stroh had declared himself ready to devote his time to this work and since he is better acquainted with Swedenborg's writings and manuscripts than any one else, it would be desirable to provide an opportunity for printing. From the beginning, Mr. Retzius had promised to pay the cost of printing volume I; and the Foundation for Lara Hierta's Memory had placed Kr. 700 at the disposal of the ACADEMY OF SCIENCES for the copying of manuscripts. The expenses thus far incurred had amounted to Kr. 1,729:25, and in addition to

this there was Kr. 673:80 for proof reading; Kr. 81 for some illustrations and Kr. 4,127:30 for printing up-to-date, making a total Kr. 6,611:35, to which must be added an expense of Kr. 100, making altogether Kr. 6,711:35. Subtracting the appropriation from The Foundation for Lara Hierta's Memory, this left an expense of Kr. 6,011:35, to which must be added expenses for printing and proof reading for the current year, calculated at from two to three thousand kronor. The whole expense would therefore amount to about Kr. 9,000. Mr. Retzius declared that he was willing to meet the cost of volumes II and III also; but it was important to obtain means for the printing of the volumes that were to follow. He therefore invited the Members of the Committee to express themselves concerning the proposal to turn this question over to the ACADEMY OF SCIENCES; and he offered to urge at the meeting of the Executive Committee of that Body on the 5th instant, when the Academy's budget would come up for discussion, that if possible an appropriation for the continued publication of Swedenborg's writings be included in the proposed budget. One might calculate that the cost for the other volumes would about approximate the cost for volumes I to III and one might hope that by the sale of these latter the amount of Kr. 3,000 might be received. It would be evident therefore that about Kr. 6,000 would be needed for the printing of the other volumes. Mr. Retzius therefore proposed that an application be made for an appropriation of Kr. 2,000 for the year 1907 and for a similar amount during the two next following years. The Committee endorsed this proposal.

4. The Committee delegated to its Members competent in the special subjects in question to try in consultation with Mr. Stroh to examine what ought to go into the remaining volumes in anatomy, physiology and psychology.

5. The Committee expressed its thankfulness to Professor Retzius for his literary and financial support.

GUSTAF RETZIUS.

MINUTES OF MEETING HELD ON 31ST MAY, 1910.

Present: Messrs. Retzius, Nathorst and Henschen; also Mr. Alfred H. Stroh.

Messrs. Arrhenius and Müller had given notice that they would be unable to attend

1. The proposal of Professor Retzius that Mr. Stroh be appointed Secretary of the Committee, approved.

2. Minutes of October 31st, 1906, approved.

3. The President stated that the ACADEMY had granted an appropriation of Kr. 1,000, which was taken up in the Academy's budget for the year 1907.

4. The Secretary read an account of the work done since the preceding meeting. After some additions to their contents, volumes I and II had appeared in 1907 and 1908. In laying these volumes before the meetings of the ACADEMY, President Retzius had spoken of the development of the work, and also of the steps taken from 1906 to 1908 looking to the removal of Swedenborg's remains to Sweden. The ACADEMY had also discussed the removal of these remains to the Cathedral of Upsala, where the remains were finally received.

Professor Erik Müller, of the Caroline Institute, had been appointed Member of the Committee, in place of Professor Chr. Loven, deceased. During the summer of 1908, Mr. Stroh travelled to England and discussed the work in Sweden; the SWEDENBORG SOCIETY had declared itself willing to buy for cash 125 copies of the whole series of the Academy's Swedenborg OPERA, if the "Opera Philosophica et Mineralia" were included in the series. About 350 copies of the first three volumes thus far published have been subscribed for and about 50 copies have been presented to Libraries, etc. It is highly desirable that the next volumes to be printed should be issued in an edition of at least 1,000 copies, especially since a larger sum than had been hoped for, had already resulted from the sale of the two published volumes.

The printing for volume III, with an introduction by Mr. Stroh is nearly finished. Professor Nils Duner has declared

his willingness to prepare an introduction for volume IV, containing the *DAEDALUS HYPERBOREUS*, etc., relating to the earliest history of the Royal Society of Sciences. Since then, the *ROYAL SOCIETY OF SCIENCES* has declared its intention to publish a fac simile of the *Daedalus* on the occasion of its Bicentenary Jubilee in November of the present year. The Secretary concluded by referring to the coming Swedenborg Congress in London.

5. A proposed Table of Contents, comprising eleven titles, drawn up by Mr. Stroh for the Academy's edition of the Swedenborg *OPERA* was read.

6. For the present the Committee decided to propose to the *ACADEMY*, that, commencing with volume IV, the size of the editions be increased to 1,000 copies; also to recommend that the *DAEDALUS HYPERBOREUS* be included with volume IV as a facsimile, and that the *ROYAL SOCIETY OF SCIENCES AT UPSALA* be granted the right to take a reprint thereof as a festival publication for its Bicentenary Jubilee.

The offers of Messrs. Stroh and Duner to prepare the introduction to volumes III and IV were accepted.

It was decided to recommend to the *ACADEMY* that if funds permitted the three volumes of *OPERA PHILOSOPHICA ET MINERALIA* be reproduced in a photolithographic facsimile in a somewhat reduced size, so as to conform to the size of the present publication, and that a written certificate be requested from the *SWEDENBORG SOCIETY* validifying the offer to subscribe for 125 copies of the whole series provided the *OPERA PHILOSOPHICA ET MINERALIA* be included in that series. The Committee agreed to the order of the publication of the remaining *OPERA* as outlined by Mr. Stroh.

7. Professor Henschen informed the Committee that he had accepted the invitation to represent the Committee at the approaching Swedenborg Congress, and requested to present the greetings of the Committee and, if possible, also a copy of the Krafft portrait of Swedenborg on behalf of the Committee. Professor Retzius offered to contribute one-half of

the cost of the portrait, and Professor Henschen undertook to secure the rest of the cost.

ALFRED H. STROH.

MINUTES OF MEETING HELD ON APRIL 1ST, 1911.

Present: Messrs. Retzius, Nathorst, Henschen, Müller.

Mr. Arrhenius was absent on account of a foreign journey.

1. The Secretary read an account of the development of the work since the last meeting, including the appearance on November 19th, of the *DAEDALUS HYPERBOREUS*, as the festival publication of the *ROYAL SOCIETY OF SCIENCES AT UPSALA*. 1,000 copies of this work had also been simultaneously printed in preparation for volume IV of the *ROYAL ACADEMY OF SCIENCES* Series. The latter body had been represented at the Swedenborg Congress and had laid before the Congress finely bound copies of *OPERA QUÆDAM*, volumes I and II, together with a *CHRONOLOGICAL LIST*, etc., as a festival publication.

Professor Henschen, representing the Committee, had presented to the Congress a copy of Krafft's portrait of Swedenborg, executed by Jean Haagen, the expense having been defrayed by Messrs. Retzius, Henschen, Arrhenius, Jakob Eriksson, Hj. Sjogren and Stroh. The Secretary referred to Professor Ramstrom's report to the Congress on Swedenborg's skull. Professor Ramstrom had declared himself willing to write an introduction to Swedenborg's work *DE CEREBRO*, which would constitute volume X of the *OPERA QUÆDAM*.

At the meeting of the *ACADEMY* on March 8th, 1911, Mr. Retzius gave an account of the development of Swedenborg's work during the past year and laid on the Academy's table volume III of *OPERA QUÆDAM*, together with twelve festival publications which had appeared in the year 1910. Mr. Retzius had fulfilled his promise to defray expenses for these first three volumes, and quite a large sum had been received from their sale. The publication of the next volume was, therefore, secured.

2. It was decided to recommend to the *ACADEMY* that vol-

ume V comprise *Varia Cosmologica, Physiologica et Psychologica*. The Secretary's offer to write an introduction for this part, was accepted and recommended to the ACADEMY.

3. Decided to recommend to the ACADEMY that volume VI be the *Principia Rerum Naturalium* with an introduction by Professor Peter Klason, who has declared his willingness to write this introduction.

4. Decided to recommend to the ACADEMY that, in connection with his investigations of Swedenborg's work in the anatomy and physiology of the brain, with especial regard to the history of the science in question, Professor Ramstrom be requested to write an introduction to the volume, which will contain *DE CEREBRO*.

5. Decided to recommend to the ACADEMY that Professor Henschen undertake an introduction for the volume which will contain the *DE MORBIS CEREBRI*.

6. The arrangement of the volumes, as at present contemplated by the Committee, is as follows:—

Vol. I. *Geologica et Epistolae*.

II. *Cosmologica*.

III. *Miscellanea de Rebus Naturalibus*.

IV. *Daedalus Hyperboreus*, etc. Introduction by Professor Duner.

V. *Varia Cosmologica, Physiologica et Psychologica*. Introduction by Mr. Stroh.

VI. *Principia Rerum Naturalium*. Introduction by Professor Klason.

VII. *De Ferro*.

VIII. *De Cupro*.

IX. *Oeconomia Regni Animalis*, etc.

X. *De Cerebro*, etc. Introduction by Professor Ramstrom.

XI. *De Morbis Cerebri*. Introduction by Professor Henschen.

XII. *Regnum Animale*, etc.

ALFRED H. STROH.

Memorandum. Addressed to the Members of the Committee by Mr. Retzius.

Since the Committee, not having finished its work, may be considered still active, and the Secretary, Mr. Stroh, having recovered from his illness, and being now able to pursue the publication of the *OPERA QUAEDAM*, of which three volumes have been published, the undersigned requests that the following proposal be presented to the Members of the Committee by circulation for their judgment and acceptance by signature, in order that it may be submitted to the *ROYAL ACADEMY OF SCIENCES*.

1. On May 11th, 1910, the Committee decided to recommend to the Academy, that, beginning with volume IV, the edition of the *OPERA* be increased from 500 copies to 1,000, which proposal was endorsed by the Academy. This decision has been effective only as regards the *DAEDALUS HYPERBOREUS* intended for inclusion in one of the volumes to be printed. The decision was occasioned by the circumstance that the work had a considerably greater sale in England and America than had been expected. It has been found, however, that there still remain on hand no less than 100 copies of volumes III, and no further considerable sale of any of them can now be expected. It therefore seems proper that for future volumes we return to the number 500 copies; we ask, therefore, a decision to this effect.

2. Since Mr. Stroh, without any remuneration from any Swedish Institution, has with especial care and special knowledge had a hand in editing the first three volumes of the *OPERA* and has succeeded in raising the sale of these volumes and thus essentially increasing the income for the Academy Swedenborg Fund, it seems just and proper that for the editing of the succeeding volumes he receive some editorial compensation from this Fund. I have found that he would be satisfied with as low a sum as Kr. 20: per sheet. I therefore recommend this sum, especially since the Swedenborg Fund now amounting to over Kr. 4,000 has come into existence solely from the sale of the first three volumes, for which the *ACADEMY* has not expended anything, but, on the contrary, has for several years received all the income arising from interest.

3. At private expense an edition of 2,000 copies of the Introductory articles to these volumes was brought together in a series under the title "Emanuel Swedenborg as a Scientist." 1,000 copies of DAEDALUS HYPERBOREUS have already been printed in preparation for volume IV. It is now proposed that Mr. Stroh be permitted to include 500 copies of these prints in a work published by him "The Swedenborg Archives;" especially since the expense for printing this work has been met privately. I request that the Committee and ACADEMY will consent to this proposal.

4. It is proposed that the Minutes of the Swedenborg Committee with appendices be turned over to the ACADEMY, and that Mr. Stroh receive a commission to continue the editorial activity of publishing the OPERA QUÆDAM, the expense of which, as far as possible, may be met by the income from the sale of the volumes.

Stockholm, May 9th, 1915.

GUSTAF RETZIUS.

*Hitherto President of the Swedenborg Committee
of the Academy of Sciences.*

S. G. NATHORST.

S. E. HENSCHEN.

SVANTE ARRHENIUS.

ERIK MULLER.

On May 11th the above communication, signed by all the Members of the Swedenborg Committee, was submitted by Dr. Retzius to the Royal Academy of Sciences for action.

EXTRACT FROM MINUTES OF ROYAL SWEDISH ACADEMY OF
SCIENCES, STOCKHOLM, MAY 26TH, 1915.

' ' 7 After reading the above communication from Dr. Retzius the Secretary continued that on the advice of the Executive Committee the ACADEMY agreed to the proposal that in the publication of the future volumes of the OPERA, Mr. Stroh receive an honorarium of Kr. 20 per sheet; and that the publication of these volumes, so far as possible, be paid for by the money received and to be received from their sale. It was desired, however, that no steps be taken for the composing of any volume before the Editor had submitted to the Secretary

of the ACADEMY a financial plan for the publication of the volume; this plan to have the Secretary's, or, if he found it necessary, the Academy's approval. The ACADEMY had also proposed that the four following volumes of the OPERA should be published in an edition of only 500 copies and that Mr. Stroh receive 500 copies of the separately printed introductory articles and receive permission to introduce these into his series "The Swedenborg Archives;" and that the Academy should receive in its keeping the Minutes of the Committee with Appendices.

The above proposals were all endorsed by the Academy.

E. W. MILLERS.

NOTE BY THE EDITOR.—The MS. on the Brain referred to in the above, as borrowed by the Committee, is a transcript of Codex 55, made from PHOTOLITHOGRAPHED MSS., V, by Professor P. B. Cabell, and placed in Urbana University. It was duly sent to the Swedenborg Committee, and is now in the Committee's charge.

The MSS. copied by order of the Committee itself, are Codices 36, 57, and 65. Codex 36 was also copied by the SWEDENBORG SCIENTIFIC ASSOCIATION, and will be translated for the NEW PHILOSOPHY under the title "A Philosopher's Notebook." Codex 65 was photolithographed in part (4 *Phot. MSS.*, V) and is now appearing in the NEW PHILOSOPHY. Codex 57 contains Swedenborg's latest writing on the Brain together with many anatomical citations.

A FEW NOTES ON CLISSOLD'S TRANSLATION OF THE PRINCIPIA.

BY ERNEST PFEIFFER.

From a cursory comparison of the two extant translations of the *PRINCIPIA* with the Latin text, it is evident, that both contain a considerable number of mistakes of such a character, as to make the understanding of the author's meaning often obscure and even impossible. It is true that the "revised" edition, published in London, 1912, is much worse than that by Clissold, London, 1846, in respect both to the editorial features, and to the translation; but it must also be said, that very many of the erroneous renderings have been copied from Clissold. In view of the seriousness of some of these mistakes, it seems justifiable to publish a selected list of the most important ones that have come to our notice, for the benefit of those who are dependent on translations.

All the following items occur both in the editions of 1846 and 1912. We have not noted such errors of Clissold, as are corrected in the new edition; (as a fact, there are only very few of this kind); nor have we listed the new errors, which are not to be found in Clissold, but which were introduced in 1912; nor do we note the corrections, which have already been put on record, by Professor Acton in the issue of *THE NEW PHILOSOPHY*, for April, 1913.

LATIN.	CLISSOLD.	CORRECT TRANSLATION.
Princ. I, ii, 17. Sique figura sit perfectissima, erunt etiam omnia talia entia prorsus simillima.	Vol. I, p. 61. And if such figure be most perfect, all entities of a like kind must also bear a full and entire resemblance to it.	And if such figure be most perfect, all entities of this kind must be entirely similar to each other.

LATIN.

Princ. I, v. 29.

Sunt activa haec extra sphaeram subtilissimi nostri sensus, praeter quod in particulas magis compositas agant, quarum motus per contiguum ad crassioris elementi particulas delatus tandem se cum organis sensuum communicare potest.

Princ. I, vi, 5.

Quum itaque sit vis agens ab activis versus superficiem illam cavam, et pariter vis agens ab activis versus superficiem convexam. . . .

As the actives which are here mentioned are of two different kinds, namely, actives of the first finite in the first case and actives of the point in the second, it is necessary to say in both cases, "directed from actives," etc., without the article.

Princ. I, vii, De activ. tert. 5.

Non enim in eadem ratione major potest esse celeritas in activo secundi, prout est massa major in activo tertii.

Princ. I, viii, 5.

Quod ex his iterum oriri possint particulae novae elementares: sunt enim similia finitis antecedentibus, quae superficiem elementarium constituunt: existit origo illorum prope spatium magnum solare, ubi adsunt activa tam primi, quam secundi; et quae in finita altioris potentiae sive majoris dimensionis, etiam fortius agere possint.

CLISSOLD.

Vol. I, p. 136.

These actives transcend the sphere of the most subtle sense; for they act upon those more compounded particles, whose motion being conveyed by contiguity to the particles constituting a still crasser element, form at length a communication with the organs of the senses.

Vol. I, p. 145.

Since therefore there is an acting force directed from the actives toward the concave surface, and an active force directed from the actives toward the convex surface. . . .

Vol. I, p. 186.

For the greater velocity in the active of the second cannot be in the same ratio as the larger mass in the active of the third.

Vol. I, p. 193.

That from these third finites there may arise again new elementary particles: for these particles are similar to the antecedent finites which constitute the surface of the elementaries. They originate near the large solar space where are the actives both of the first and second finite; and they can act with a greater strength on the finites of higher power or larger dimension.

CORRECT TRANSLATION.

These actives transcend the sphere of the most subtle sense; *except that they act* upon those more compounded particles, . . . etc., etc.

Since therefore there is an acting force directed *from actives* toward the concave surface, and an acting force directed *from actives* toward the convex surface. . . .

For *the velocity* in the active of the second cannot be in the same ratio *greater*, as the mass in the active of the third *is larger*.

. They originate near the large solar space where are the actives both of the first and second finite, *which can act* with a greater strength on the finites of higher power or larger dimension.

LATIN.

Princ. I, ix, 11.

Ipsa particula prima elementaris maxime et in finitum tertium compressa superficitenus elementarem hanc ut finitum componit, sed adhuc ut elementaris extra fluit, et superficiem hujus expansam et aequilibratam cum reagentibus activis tenet.

Princ. I, x, 2, in fine.

Ergo si spatium solare sit, et in medio sui activissimum, in hoc rerum primordio secundum principiorum *serien* non aliis potuerant circumdari, quam unice finitis primi circumcirca in angustias sic per actionem spatii redactis.

Princ. II, i, 11.

Si jam poruli effluviolum unice particulis elementaribus magneticis stipati et referti sint, non possunt quiescere: ipsae enim particulae elementares inclusae axillariter perpetuo moventur, ut in theoria illarum dictum est, et consequenter cum illis ipsa corpuscula vel effluvia, quorum interiorum contextum et sinum unice complent et quasi distendunt.

CLISSOLD.

Vol. I, p. 201.

The first elementary particle itself, compressed as to its surface to the utmost and into the third finite, composes this elementary particle as a finite. Hitherto, however, it flows extraneously as an elementary particle, and keeps the surface of the first elementary particle expanded and equilibrated with actives reacting.

Vol. I, 204.

If, therefore, there be a solar space, and in its middle the most perfect activity, then, according to our principles, it could not, in this primordial state of things, be surrounded with any other than the finites of the first active, pressed all around into a narrow compass by the action of the space.

Vol. I, 223.

If now the porules occupied by the effluvia are crowded, and filled only with magnetic particles, these particles cannot possibly be quiescent; for the other elementary particles they enclose have themselves a perpetual axillary motion, as we mentioned in our theory of these particles; and consequently, together with these, the corpuscles or effluvia whose interior texture and sinuses they alone fill and as it were distend.

CORRECT TRANSLATION.

The first elementary particle itself, compressed as to its surface to the utmost and into the third finite, composes this elementary particle as a finite. *But at the same time it also flows extraneously as an elementary particle, and keeps its surface [namely, the surface of the just mentioned second elementary particle], expanded and equilibrated with actives reacting [from within].*

If, therefore, there be a solar space, and in its middle the most perfect activity, then, according to our principles, it could not, in this primordial state of things, be surrounded with any other than *the first finites*, pressed all around into a narrow compass by the action of the space.

If now the porules of *the effluvia* are crowded and filled only with magnetic elementary particles, *the effluvia* cannot possibly be quiescent; for *the elementary particles* they enclose have themselves a perpetual axillary motion, etc., etc.

This is perhaps the worst among the many errors in Clissold's trans-

lation. A person who has only this English text before him, and is therefore dependent on it alone, cannot possibly form an idea of the ingenious theory of the magnet, here given by Swedenborg.

LATIN.	CLISSOLD.	CORRECT TRANSLATION.
Princ. II, iii, in fine. Exp. viii. Poli duo amici alteri.	Vol. I, p. 264. The first two amicable poles.	The <i>second two</i> amicable poles.
Princ. II, viii, 1. pariter etiam per flammam activis quinti constantem.	Vol. I, p. 312. They can likewise permeate flame, which consists of the actives of the fifth element.	They can likewise permeate flame, which consists of the actives of the <i>fifth finite</i> .
Princ. III, i, in pr. Secundum sensus finitos putamus finitum esse intermedium, ab ejus minimo tendens ad ejus maximum; sed quia finitum utrinque in respectu ad infinitum est nihil, hinc concipiendum est intermedium respectu ut nihil, et sic ejus maximum et minimum unum idemque.	Vol. II, p. 229. Our finite senses are apt to conceive, that, in the infinite, there is some finite intermediate between the least and the greatest, tending from the least to the greatest; but inasmuch as what is finite is as nothing in respect to what is infinite, we ought to consider the intermediate between them as also respectively nothing; so that in the infinite the greatest and least ens are one and the same.	According to our finite senses we think the <i>finite to be an intermediate tending from the infinite's least to its greatest. But since the finite on either side, in respect to the infinite, is nothing, therefore, the intermediate is to be conceived of as being relatively nothing; and thus in the infinite the greatest and least are one and the same.</i>
Princ. III, ii, 2. Mundus praeicipue respicit primum suum, sic utraque principia, tam passivum quam activum, non modo in perpetuo nexu sunt, sed etiam in perpetuo vigore; hoc est, si omnia entia in sua serie sunt in motu, in eodem scilicet, per quem orta sunt.	Vol. II, p. 244. That to which the world has its principal relation, is, its first beginning; hence its first principles, both active and passive, are not only in perpetual connection, but in perpetual vigor; provided all the entities in its series are in motion,—in the same, for instance, as that from which they derived their origin.	That to which the world has its principal relation, is, its first beginning; hence its first principles, both active and passive, are not only in perpetual connection, but in perpetual vigor; provided all the entities in their series are in motion,—in the same, namely, as that from which they derived their origin.

LATIN.

Princ. III, iii, in pr.

Praeter finitum, activum et elementare nihil in toto illo regno exstare potest; scilicet praeter bina principia, et tertium ex principiis compositum.

Princ. III, iv, 1.

Quod particulae elementares secundae propter easdem causas propter spatium activum solare summe comprimantur, et per summam compressionem desinant elementares esse; et quod finita existant, prout elementares primae.

Princ. III, iv, 4.

... per compressionem elementarium in finita.
....

Princ. III, iv, in fine.

Ex his constare potest, stellae in coelo non oriri modo, sed ortas etiam elementum alterum circum se formare, dein post tempus incrustari.

Princ. III, v, in pr.

Simillima sibi natura est, et ut supra dictum, eadem nobis in maximis, quae in minimis; in vortice solari, quae in voluminulo ejus; eadem, quum primum nata, quam cum adulta sit; eadem in simplici et composito; in uno fine ut in altero, et consequenter in mediis.

CLISSOLD.

Vol. II, p. 249.

Besides the finite, nothing active and elementary can exist throughout the whole of that kingdom: nothing I mean, besides those two principles, and a third compounded of the two.

Vol. II, p. 258.

That by reason of the same causes, the second elementary particles are most highly compressed near the solar active space; that in consequence of this compression, they cease to be elementaries; that finites exist in the same manner as first elementaries.

Vol. II, p. 260.

By the compression of the elementaries upon the finites,

Vol. II, p. 272.

From these statements it appears, not only that stars are seen to come into view in the heavens, but that afterwards they form around themselves another element; and in course of time become incrustated.

Vol. II, p. 273.

.....
.....
.....
.....
.....; the same in the simple as in the compound; the same in one end as in the other, and hence also the same as in intermediates.

CORRECT TRANSLATION.

Besides the finite, *the active, and the elementary, nothing else* can exist throughout the whole of that kingdom: nothing I mean, besides those two principles, and a third compounded of the two.

That by reason of the same causes, the second elementary particles are most highly compressed near the solar active space; that in consequence of this compression, they cease to be elementaries, *and are forthwith finites*, [or, exist now as finites], just as in the case of the first elementaries.

By the compression of the elementaries *into* finites.

From these statements it appears, not only that stars *come into being* in the heavens, but that afterwards they form around themselves *the second element*, and in course of time become incrustated.

..... and hence she is also the same *in intermediates*.

LATIN.	CLISSOLD.	CORRECT TRANSLATION.
Princ. III, v. in pr. ibidem. ... est sibi similis in individuo hoc magno, scilicet in planeta, prout in parvo sive in finito.	Vol. II, p. 273. [Nature] is similar to herself in the large in- dividual ens or planet and in the small or finite ens.	[Nature] is similar to herself in the large ens or planet, and in the small ens or finite.
Princ. III, v. 5, in pr. ... elementares primæ inclusæ....	Vol. II, p. 280. ... the first enclosed elementary particles.	... the enclosed first elementary particles...
Princ. III, v. 18. ... et quod sic [na- tura] veluti pure per causas operetur, et sem- per in sua causa sit, ut effectus ejus vocari pos- sit causa; et posterius ejus prius; et princi- piatum ejus principium; et sic una eademque et simplicissima.	Vol. II, p. 291. ... in this manner she operates as it were pure- ly by causes, and is al- ways in her cause in or- der that she may be called the cause of her ef- fect, that the posterior may be called her prior, the principiate her prin- ciple; thus that she may be always one and the same, and preserve the most perfect simplicity.	... in this manner she operates as it were purely by causes, and is always in her cause, in order that <i>its effect may be called a cause</i>, that <i>its posterior</i> may be called a prior, and <i>its principiate</i> a principle. Thus <i>she is always one and the same</i>, and pre- serves the utmost sim- plicity.

The signification of "ejus" is here quite misunderstood, as is especially evident from the first instance: "ut effectus ejus vocari possit causa," which means, "that its effect may be called a cause," and we think that also the rest must be translated in the same way, namely: "that its posterior may be called a prior, and its principiate a principle. The only difficulty is that the original edition has a comma between "posterius" et "ejus," which would make the "ejus" belong to "prius," while according to the whole meaning of the passage it seems to belong to "posterius." For this reason, probably, the comma was simply left out in the new edition of the third part of the Principia by A. H. Stroh: Eman. Swedenborg, Opera Quaedam, vol. 2. Holmiae, 1908, p. 306. At any rate, according to all rules of grammar, "ejus" cannot possibly refer to "natura;" it ought then not to be "ejus," but "suus," namely, "effectus suus," "posterius suum," and "principiatum suum."

The conclusion of the passages ought to be, "thus she is always one and the same, and preserves the most perfect simplicity."

LATIN.

Princ. III, v. 21.

Ergo cum motus localis sive nisus in motum localem ætheris sit causa luminis et lumen causa specierum oculis representatarum, potest lumen tam a causa calida, quam a frigida oriri.

Princ. III, v. 21.

Si enim dantur corpuscula tam exigua, ut tantummodo ætherem moveant, prout dantur corpuscula sive effluvia e magnete proceduntia, quæ tantummodo elementum secundum sive magneticum movent; dico quod per motum talium corpusculorum sive effluviorum lumen existat.

Princ. III, v. 21, p. 409, lin. 3, ab infra.

Nam nulla non corpora dantur quæ non aliquo modo ab æthere penetrantur, ad minimum, qua texturam et compositionem suam majorem et laxiorem.

Princ. III, viii, in titulo.

De igne; sive de activis quarti, quinti, et sequentibus.

Princ. III, viii, 1, in fine.

Non enim illis spatium excurrendi liberum est, impredientibus elementariis, et illa in statu se actuandi constituta in superficies novas, non aliter ac æther et aer aquas seu alios liquores, convolventilibus.

CLISSOLD.

Vol. II, p. 297.

Since therefore local motion, or the effort to local motion, in the ether, is the cause of light, and light is the cause of the species of things represented to the eye, it follows that light may arise from either warmth or cold as a cause.

Vol. II, p. 297.

For if there be any corpuscles so small as to move only the ether, like the corpuscles or effluvia, for instance, proceeding from the magnet, and which move only the second or magnetic element; then I would observe, that by means of the motions of these corpuscles or effluvia, light exists.

Vol. II, p. 298.

For there are no bodies existing which are not in some way or other penetrated by the ether, in regard at least to their texture and their larger and looser composition.

Vol. II, p. 311.

On fire, or the actives of the fourth, fifth and following finites.

Vol. II, p. 312.

For they have no space for their excursive motions, inasmuch as elementaries are present to impede them and to convolute them, while in the state of actuating themselves, into new surfaces; as in the case of ether or air when converted into water or other liquors.

CORRECT TRANSLATION.

... , it follows that light may arise from either a warm or from a cold cause.

For if there be any corpuscles so small as to move only the ether, just as there are corpuscles or effluvia proceeding from the magnet which move only the second or magnetic element; then I would observe, etc.

For there are no bodies existing which are not in some way or other penetrated by the ether, in regard at least to their larger and looser texture and composition.

On fire, or the actives of the fourth and fifth finites, and on the following actives.

... ; as in the case of ether and air when convoluting water or other liquors.

LATIN.

Princ. III, viii, 14.

Quod spatium avvis quinti constans nullius ponderis sit, nisi quantum ponderis ei dare possit volumen aetherearum et elementarium primarum et secundarum in spatio illo contiguum formantium.

Princ. III, viii, 14, in fine.

... ergo spatium secundum situm aetheris aliquatenus regi potest: pariter secundum situm elementorum primi et secundi.

Princ. III, x, 4.

Quod vapores a bullis aqueis in eo differant, scilicet quod vapores intus modo aetherem recondant; bullae vero aetherem et simul aerem. In his adhuc videre licet aliam progeniem naturae elementaris; scilicet quum non modo aether sed etiam aer se superficie aquea includat.

Princ. III, xii, 3, in fine.

... ; tunc in paradisu et in tellurem homo primus ad omnem huius mundi harmoniam creatus introductus est; qui subtilioris aurae participes sive rationalis factus est, ut sciret adhuc mundum, qua suas partes et speciatim, perfectiorem reddere.

CLISSOLD.

Vol. II, p. 325.

That the space consisting of the actives of the fifth finite has no weight except what is given it by the volume of first and second ethereal, elementary particles forming the contiguous extense in this space.

Vol. II, p. 325.

... the space therefore may in some measure be affected according to the situation of the ether, as also according to the situation of the elements of the first and second finite.

Vol. II, p. 341.

That particles of vapour differ from bubbles of water in this respect, that interiorly the former contain only ether, while bubbles contain both ether and air. In these particles of vapour we may see still a further product of elementary nature; since not only the ether, but also the air encloses itself in an aqueous surface.

Vol. II, p. 362.

... then was the first man introduced into paradise, having been created into all the harmony of the visible world; being made partaker of a more subtle or of a rational aura, in order that he might know how to render the various parts of creation around him still more perfect.

CORRECT TRANSLATION.

... by the volume of ethereal, and first and second elementary particles forming the contiguous extense in this space.

... the space therefore may in some measure be affected according to the situation of the ether, as also according to the situation of the first and second elements.

... In these bubbles of water we may see still a further product of elementary nature; ... etc.

... , then was the first man introduced into paradise, having been created into all the harmony of the visible world; being made partaker of a more subtle aura, or being made rational, in order that ... , etc.

The case last cited is not a case of mistranslation; for Clissold's rendering is in actual accordance with the Latin. The sense and the order of the words, however, plainly indicate that this rendering presumes a style of diction not characteristic of Swedenborg.

THE BRAIN.

BY EMANUEL SWEDENBORG.

(Continued.)

100. There is hardly anything met with in the animal kingdom that is more worthy of examination, than the economical dispensation of the blood in the human cerebrum. There is so great an abundance of it in the pia mater, that the latter deserves to be called a vascular network rather than a membrane. The principal vessels springing from the carotids press upon the furrows and ridges of the anfractuositities; and they are as it were so many *little sinuses of the pia mater*, not unlike the large sinuses of the dura mater. The former creep along in the duplicature of their pia mater like the latter in the duplicature of their grosser mater. The former are incumbent on the processes of the pia meninx, just as the latter are incumbent on those of the dura meninx, such as the falciform and second processes.† The former disseminate throughout the subjacent process and beyond this into the cortex, an infinitude of offshoots which again return into their little sinuses; in the process of the falx, the second, and other processes, there is also an infinitude of offshoots which insinuate themselves into their sinuses and at the same time insert themselves into the neighboring substance. Under the serpentine processes of the pia mater also there are perhaps lesser sinuses, not unlike as in the case of the inferior longitudinal and lateral sinuses sometimes found in the first and second processes of the dura mater. Moreover the former frequently run together into a kind of common sinus, which, descending obliquely or in a straight direction, is rooted in the cortical and medullary substance; just like the great fourth

†The falciform or longitudinal and the tentorium the Second duplicature of the dura mater was process.
formerly called the First process;

sinus which in like manner exists towards the interior parts of the whole cerebrum as far as the pineal gland. The former derive their blood into diverticles here and there hollowed out in the medullary substance; scarcely otherwise than as do the great sinuses, which go into the lateral sinuses and these into diverticles in front of and within the jugular fossæ. The former being incumbent on the serpentine processes of the cerebrum which are largely extended into the gyres and anfractuosities, exceed in number the venous sinuses which merely divide the cerebrum into two hemispheres, and the cerebrum from the cerebellum, between which two organs also runs the fourth sinus. And yet each little sinus that enters in seems to be appointed over its own bed of cortical substance; for each area is divided into many beds.

101. But whether these little sinuses, so-called, of the pia mater are vessels of the venous blood or of the arterial, or whether they take their nature from both seems to be justly a matter of doubt. That they take their nature from both is apparent from the fact that the arriving arterial blood after its volatile part has been exhaled and expended on the cortex, flows back through the same vessels; that is, it enters as arterial and returns as venous. Nor does all this blood afterwards pass over into the veins which extend to the dura mater and then to the sinuses where they terminate; but it enters and returns again and again, according as it acts strongly or weakly, swiftly or sluggishly, or according as the cerebrum holds its breathing while revolving its ideas and weighing its reasons. At any rate the residual part of the blood which returns from the cortical substance to its little sinuses does not enjoy the like nature as that which presses from the sinuses to the cortex. Nor it is any objection that in the cerebrum there are separate little veins which afterwards take up this blood and run into other veins at various angles, obtuse, acute and right, in that there is here the same character of blood and serum. Nor does the blood seem to be received by these veins for any other end than that it may not be able to return from them. For as soon as it arrives here it must necessarily be derived into the

sinuses. Hence it can in some measure be concluded that these sinuses are not mere diverticles of the blood. The case is different, however, in the cerebellum, in the embryo, and in certain brute animals. In these the blood is not dispensed according to the need of a like state as is the case in the adult human cerebrum.

102. It is indeed the cerebrum itself that dispenses its blood; nor does the promotion of the blood depend in any way upon the heart, excepting in the circumstance that its systolic animation coincides with the moments of the vibrations of the heart. For the cerebrum is itself appointed over its blood. It both brings the blood to itself and impells it from itself; and it brings not only the quantity demanded by the state of its organs, but the quality also. In anger, indignation, courage, intentness, it admits an abundance of blood, and when admitted holds it for a long time, and when thus held expells it sparingly; but in sadness, grief, fear, it admits only a little,—as may be evident from many considerations. Thus each of its states or affections prescribes and commands a blood of its own quantity and quality,—on which matter we shall again speak later. Therefore the little sinuses mentioned above are diverticles rather than arteries or veins.

103. These little sinuses draw their common wave from the trunks of the carotid and vertebral arteries, and then so distribute it among themselves that an equable, desired and proportioned part is furnished to each and all according to need; for one sinus communicates with another, and it draws what it needs from its neighbor, these from their neighbors and all from the common store. Thus there is not a single spherule of the corticle substance that is not provided for by the common trunk and particular branches, so that there is a communion of all the vessels, and each can enter in, cross over, and go back to the aid of another. For besides the fact that they lack valves, it is according to the experiments of Willis, Vieussens and other anatomists, that if one of them is injected with a colored liquor all are tinged with the same color; this would not be the case unless they were diverticles.

104. Moreover an economic ministration and communion of this kind is required here, because from the blood must be elicited all the juice that shall ever surround the fibres and nerves, and which they demand in great abundance; and thus in order that the whole system may be perpetually sustained, nourished, integrated and vivified.

105. Such economic administration of the blood is required here, also because all the antiquated and integral blood must be broken up into its original parts and elements adapted for the reintegration of every single part of the whole body*—

*Here should follow p. 133 of the autograph; but this and the following pages up to p. 204 (72 pp.) is lost. These pages contain the end of this Third Part of Transaction I, and the commencement of Transaction II, on the Membranes of the Brain.

The two transactions were numbered independently,—as is also the case in the two published Transactions of the *ECONOMY*. But in the *ANIMAL KINGDOM* the author changed this plan and made the three published "Parts" of that work consecutive in numbering. For the sake of easier reference we have adopted the same plan as applied to the "Transactions" of the present work. In the interest of ac-

curacy, however, we retain the original paragraph numbers, which will be printed in lighter type.

There is no indication as to the total number of paragraphs comprised in Transaction I. To approximate this number we have taken the average number of paragraphs contained in the pages preceding the 72 pages that are lost. These we find to be 63; and deducting from this the known 42 paragraphs of Transaction II the inference is, that Transaction I ended with n. 126. Therefore, if we make the numbering of the two Transactions continuous, n. 42 of Transaction II would be n. 168 of the whole work when numbered consecutively.

TRANSACTION II.

168. 42. —the great intercostal* and the par vagum. Thus, unless there were a unanimous consent of motions between brain and heart, vessels and fibres, blood and nervous juice, the little machine would at once lie open, and the connections be torn asunder; for a highly delicate system of this kind, grows by the concord of all its parts. The same also becomes evident from the circle of the blood in the embryo, where the whole blood passes through the cerebrum instead of through the lungs, as is the case after birth; and this, in order that the cerebrum may then perform the office of the lungs. Of this matter we shall treat more fully, and by means of anatomical experience, in the following pages; where it will also be shown that when the lungs begin to breathe, the alternations of the animating cerebrum differ from those of the heart.

169. 43. That the motion of the brain's expansion and compression is directed from a certain transverse axis extending from the middle of the occipital bone, through the cerebrum, to the sella Turcica in the sphenoid bone, is clear both from the harmonious junctures of the bones of the cranium, and from the fact that all these bones aim at the above two points. In the middle of the occipital bone is a tuberosity and ridge of the utmost firmness, where the sinuses of the upper cerebrum meet those of the inner; there also, are the first and second processes of the dura mater. On the other side, and almost opposite, is the sella Turcica of the sphenoid bone, which occupies the centre of that bone, and consequently of all the other bones of the cranium; for it is fastened to well nigh all of them, and for this reason is called the basilar bone. Therefore whatever action goes on in the periphery of the cerebrum, progresses towards these centres, by reason of its regarding a certain intermediate axis occupied by the fourth sinus or torcular Herophili, and continued by the infundibulum which extends into the pituitary gland lying in the centre of

*Now called the sympathetic.

the above mentioned sella equina. Moreover, in the middle of the occiput, that is, in the superior termination of the axis, the cerebellum joins with the cerebrum, and afterwards both of them join with the medulla oblongata. At the other terminus, the remaining sinuses of the dura mater, called the short and the long,* come together; and the carotid arteries apply themselves round about. Granting then that there is an animation of the cerebrum, and granting a regularity and constancy in this animation, then both an axis of direction, and a correspondence of the extremities of this axis with the internal structure, is also granted.

*Now called the inferior and superior petrosal sinuses.

(To be continued.)

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